# **COMPUTERWORLD**

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Industry winners outnumber losers as CDC, Prime and Software Publishing, among others, catch the rising tide. Piges 4, 83.

Whatever happened to DEC's disaster-recovery services plan? Page 25.

## Model 50 winning MIS fans

BY ED SCANNELL

Despite some complaints from early users about the apparent slowness of the IBM Personal System(2 Model 56's hard disk drive, MIS and morro managers said last week that improved technology actually makes the machine faster than the company's Personal Computer AT. Consequently, the managers said the Model 50 will play a major role in their future corporate

computing strategies. Based on a benchmark test conducted by a major corporation, most applications will run 25% to 50% faster on the Model 50 than they do on the AT, despite the Model 50's 80-misec disk access time, compared with the AT's 40-misec time.

"The Model 50 is faster than an AT, especially with floatingpoint applications. I am encouraging the Model 50 to be our standard machine." said Jeff Ehrlich, manager of product technology for General Electric. Co.'s Information Systems Divi-

Ebritch and other MIS professocials admitted that, multiply they had reservations about the Model 50 because of its slow disk drive. However, they said the system's disk-caching abilities and its 1:1 disk interleaving in IBM's Misro Channel architecture enable it to run applications, particularly disk-intensive applications, measurably faster than the AT runs them.

"If you run disk-intensive applications side by side on the Model 50 and AT, with and without disk caching, you'll see the Model 50 runs 1½ to two times faster," said Ralph Wagner, acting vice-president of marketing for MBI Business Centers, Inc., a retail chair in Rockolle Inc.

Continued on horse 105

NAM SEES TO A SE

## Service firms lead buying surge

Financial, insurance companies fuel computer industry turnaround

BY DOUGLAS BARNEY

The resurgence of the computer industry is being fueled largely by the intensely competitive service side of the economy, with banking, finance and insurance companies leading the buying charge, users and analysts say.

"The people who like to in-

"The people who like to invest in new equipment have the money and need the increased productivity. Finance, banking and insurance all fit in this category," says Ray Ahlberg, a senior analyst with the Department of Commerce's Science

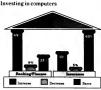
ment of Commerce's Science and Electronics Group. Users in those industries agree. "I am buying iron like it is going out of style." says George P. DiNardo, executive vice-president of Mellon Bank, N.A. in

Pattsburgh.

The recent boost in computer demand comes as welcome relied to two years of sluggish demand. "We're looking for a pickup in the economy and a pickup in industrial production. This will belt computer industry demand," says Jean W. Orr. vocepresident of Drexel Burnham

Lambert, Inc. in New York.
Capital-spending increases are also beiging sales of computers. A survey recently released by The Conference Board in New York reveals a 10% increase overall this year in capital spending, with much of that going to new technology.

Although many service sector farms are eager to buy manframes, a targer area of growthis microcomputer hardware and software. Much of this activity is prompted by new products from all major vendors, boosting the personal computer replacement.



S CSP deflects

## Systems consulting counts for big bucks at Big Eight

"The MIS executive is becoming a strategist, a true professional at sixing up business needs as well as technical potential. His area of expertise can have unparalleled power in building the future of his organization."

Excerpted from "The Changing Shape of MIS," a 1986 study by Arthur Anderson & Co.

BY CLINTON WILDER

If a company's chief financial officer and MIS director are shred to separate business lunches at the same restaurant, it is becoming more and more likely that their hosts will be from the same company—a Big Eight accounting firm.

The hallowed halls of the Big Eight accounting firm.

homes of custom software developers, systems integrators, and network designers. Armed with well-paid consultants and the contention that they know how your business works, Big Eight firms are roaring into computer-related services on the creek of the same tide that is transforming. MIS exerci-

is transforming MIS executives from techniciums to busnessmen.

The emergence of the Big Eight as major players in technology consulting is difficult to quantify; but the firms and services market analysts agree that they are among the fastest

that they are among the lastest growing providers in a rapidly growing field Mountain View, Cald-based research firm Input estimates the U.S. professional services market will grow 18% annually to \$28.7 billion in 1991. and Input Continued on page 6 critics, warms up DB2 users

BY CHARLES BABCOCK

Evaluations of IBM's fourthgeneration language. Cross System Product, still vary widelfive years after the language's first release. But experience users of the latest version say it is one of the few development environments that will yield an efficient DB2 production appli-

cation.

IBM has labeled CSP a strategic product, and some ubservers
think the language has the potential to rival DB2's perior
mance with a slow warm-up fullowed by a fast take-off in the

marketplace
"DB2 put a substantial cramp
into the independent mainframe
data base management system
market. The fourth-

The fourth-Continued on page 8

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PC language lift. D&B Computing brings fourth-generation language Nomad2 to personal computers with PC Nomad, which incorporates cascading windows and file-transfer capabilities. Page 6.

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## Sun now shining on X-Windows standard

BY NINAMARY BUBA MAGINNIS

Sun's andorvement of Y.Win

MOUNTAIN VIEW, Cald. -Sun Microsystems, Inc. an nounced last week that it will combine Version 11 of the X Window system, an emerging standard developed at MIT, with its proprietary Postscript-based Network Extensible Window System (NEWS)

dows lags far behind other major players in the technical and engineering workstation market. Ir January, many vendors collabo rated in announcing a campa to push for acceptance of X-Winws as an international star dard; supporters then included Digital Equipment Corp., Hewlett-Packard Co., Apollo Com-puter, Inc. and Data General

Sun plans to merge the X-Window Version 11 system with NEWS, offering a unified winnow system, the vendor report-X-Window Version 11, which

decision to sell Compagnie Gen-

erale des Constructions Tele

by Sweden's L. M. Ericsson AB.

The telecommunications equip

ment maker, previously an affili

ate of ITT Corp., has been the

object of a hotly contested race

that saw leaders in Washington

D.C. and Bonn, West Germany

campaigning for their respective industrial champions.

nous setback to AT&T's efforts

to penetrate the European tele-

communications market and will

likely inflame trade relations be

rame from West Germany's See

mone AC allert such France's

Icumont Schneider SA: APT -

subsidiary - and Philips NV al

hed with France's Societe Anon

(SAT); and Ericsson allied with

France's electronics firm Matra

S.A. and financial partners Bouy

des Telecommunication

ATA:T's

The final competing bids

Netherlands-bases

on the U.S. and Europ

The decision represents a so-

view of specifications, according to Steve Lerman, MIT's Project Athena director

MIT will provide the Sun version as part of the release. Ler-

Licensing NEWS announced that more

than 12 firms and universities have licensed the vendor's proprietary NEWS, including Mi crosoft Corp., Toshiba America. Inc., Tektronix, Inc., Raster Technologies, Inc., Unicad, Inc. and Acorn Computers Ltd.

Other companies that have endorsed Sun's merging of NEWS and X-Windows Version 11 include Alliant Computer Sys. tems Corp., Applix. Inc., Culler Scientific Systems, Electronic Data Systems Corp. and Floating Point Systems, Inc.

em Frame Technology Corp Franz, Inc. Intel Corp. Intellicorp. Interactive Systems Corp. Island Graphics Corp., Lucid Inc., Microport Systems, Inc., Pyramid Technology Corp., Reasoning Systems, Teknow-ledge, Inc., Visual Engineering. is scheduled to be released thus fail, will include Sun's contributions to the X architecture Inc. and Whetechapel Worksta through the comment and re

### AT&T loses French bid Sweden's Ericsson wins race for telecom giant

pay \$83 million for the debt-rad BY AMIEL KORNEL

den firm, provide \$25 million for restructuring and spend an esti-PARIS - The French govern mated \$33 million to adapt its switching equipment to French ment announced last week its

technical standards phonoues (CGCT) to a group led Penetrating the market , a joint venture of AT&T and Philips NV in the Neth lands, was looking at the CGCT acquisition as a way to penetrate the almost impervious European market for switching systems

dominated by national players such as Compagnie Generale d Electricite in France and Sie mens AG in West Germany APT, teamed up with the French group SAT, argued

throughout the battle that its bid was as European as the rest of the bads French privatigation laws lim it foreign participation of capital to 20%, but it was widely viewed

that AT&T would yield manage ment control over APT and slowly increase its capital stake. "It would be deheate," ex-plained a CGCT official, "after denationalizing CGCT, to put it in the arms of an American.

Kornel is a correspondent for CW Comgues SA and the Indosuez bank munications International News Ser The successful bidder is to vice's European bureau

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If you're tired of sort programs that fade in the stretch and empty your pockets of computer resources, give us a call today. We'll set up a demonstration that's bound to make you a SyncSort DOS backer!

## Prime's 386 system melds Unix, MS-DOS

BY DAVID BRIGHT

NATICK, Mass. - Departing from its traditional reliance on proprietary processors, nimi imputer vendor Prime Computer, Inc. reportedly will introduce tomorrow a multiuser I have supermicrocomputer based on the Intel Corp. 80386 microprocessor

he 32-user EXL 316 system es Locus Computing Corp.'s Merge 386 environment to run multiple character-mode pro-grams under Microsoft Corp. MS-DOS and AT&T Unix Systeni V Release 3 operating sys tems simultaneously. Printe officals last week stressed that the system represents a drive for compete with the company's 50 venes miny omnuter line

This product will have quite an impact on the company," de clared Leonard Halio, vice presi dent of the Small Systems Products Group According to Haho, the company expects to increase sales by addressing the growing demand for Unix in government agencies and other office envi ronments. Much of Prime's focus historically has been on scientific and engineering markets

Prime had previously tried to Unix by offering its Primix version of Unix on Prime propriclars processors. But that didn't seem to be the right thing the right time," explained Maske, settor vice-president for corporate operations and programs Prime realized that the 80386 would provide better price/performance in low end systems than proprietary processors would, he sa Halro said that the EXL 316 which can function as a file and

print server as well as a departmental system, is built almost entirely on industry-standard hards are and software. In addition to supporting the Unix and MS-DOS operating systems, the system is built around the 32-bit

Intel Corp. Multibus II, supports the Ethernet local-area net work and uses Prime EXL 316

email com puter systems interface conproffee Sec tems those features are slated to he available in

Consultant Indith Hurwitz Patricia Serbold's Office Computing Group in said Promi's adheronce to index. try standards and its solid reputation as a supplier

multiuser sys

tems may give

an advantage over some of the competituon. "Prime can stand on its own in terms of technology as well as us already established market presence and its relationship with value-added resellers," she

The EX1, 316 will be compet and not only against multiplier Unix systems from companies like NCR Corp. and Plexus Con noters. Inc. but also against the flood of 80386 multiuser Unix machines that will soon hit the market Harwitzadded.

According to Halio, the only potential problem is that the

compact floor-standing EXL 316 might be viewed as just a glordied personal computer, Some people will think of it as a PC with a few extra ports," he sand "It is not. We have designed a large-machine architecture into a very low-cost small-ma

configuration might have to obtain network license agreements from the suppliers of the programs, a Prime spokesman said. The licensing issue is one reason why Prime decided not to in clude a floppy disk drive in the



chine configuration

disk drives need not be parti

reposed to differentiate between

Microsoft to allow MS-DOS to

But users wishing to run MS-

be accessed by multiple us-

Prime has contracted with

the two operating systems.

e: 16-MHz Intel Corp. 80386 System performance: 3.2 MIPS Operating system: AT&T Unix System V Release 3 (optional Merge 386 utility runs Unix and MS-DOS simultaneously) Maximum users supported: 32 ratem bus: 32-brt Multibus II

Peripheral bus: Small computer system interface (1,25M byte/sec. transfer rate) Memory range: 2M to 8M bytes Hard-disk storage range: 90M to 1,032M bytes (with second cabinet) cations options: Ethernet with

M SNA<sup>3</sup> connectority (available ate this year

Sasc price\*: \$23,900 Availability: June

new system he added. A \$23,900 base configuration Because Merge 386 runs MS includes 2M bytes of memory. DOS as a task under Unix. the Unix, a 90M-byte hard drive, a two operating systems are smoothly integrated, according 60M-byte streaming-tage back to the two companies. For example, the Merge 386 software en vironment reportedly responds to either Unix or MS-DOS com mands, and the system's hard

up subsystem and 10 asynchrous communications lines. The Merge 386 option, including MS-DOS, is priced at \$1,800 and the Ethernet ontion with Transmission Control Protocol Internet Protocol software is \$3.000. A Locus PC Interface for linking PCs to the host costs. \$1.500 for the host software and \$150 for each individual person alcomputer

Main Editorial Office s VCTI 375 Cochrune P

## Control Data is finally back in black

After eight consecutive losing quarters, company returns to profitability make "good progress" in reduc-

10Y CLINTON WILDER MINNEAPOLIS - In another encourages first-quarter sign for the computer industry. Con trol Data Corp. has returned to profitability after eight consecuquarters in the red

CDC reported a \$6.4 million operating profit and \$7.2 million net profit, its best performance since second-quarter 1984. Revrue rose to \$821.7 million from \$796 I million a year ago, when the firm last \$21.2 mili ion. Per share net moome was 17 cents compared with a 52-cent net loss in first conserter 1986.

If CDC can maintain its momentum, it will mark one of the industry's great turnarounds

On the brink of Chapter 11 of the Federal Bankruptcy Code in 1985 and on the way to a nine figure loss for the year. CDC was forced to renegotiate credit agreements and execute a masave cost-cutting plan. "We are beginning to see the payoff from operational and financial restructuring, cost-control efforts and above all, strategic focus," CDC Chairman Robert Price said in a

Price and CDC's computer

stems and services group was profitable in the quarter, due to cost reductions implemented in the second half of 1986. The data-storage products group. which accounted for the comp ny's greatest losses during its 1985 fiscal crisis, continued to

ing costs, according to Price Other major vendors report ing quarterly results last week included the following Harris Corp. The Mel bourne, Fla., maker of comput ers, office systems and semiconductors noted several encour aging signs as profits rose 43% om year-earber levels

Harris earned \$21.9 million. or 53 cents per share, in its third fiscal quarter, compared with \$15.3 million, or 38 cents per share, a year ago. Re only marginally from \$517.3 milion to \$522.3 million, reflecting Harris's downsizing program in

the past year. President and Chief Executive Officer John T. Harriey said both the information systems and semiconduct sectors were profitable in the quarter, compared with losses in each unit a year ago

Separately, Harris named 27 year IBM veteran Martin S. Ax elrod to head its Fort Lauder date. Fla-based computer sys tems division

Comdisco, Inc. The Rosemont. III.-based lessor's diversafication into risk arbitrage paid off handsomely in the quarter, a dramatic change from the previout outstar in which substantial arbitrage losses are away Comdurn's leasing profits Before taxes. Comdisco earned more from risk arbitrage (\$23.7 mil aon) than from its computer-re-lated business (\$23 million). Net income was \$28.5 million, or 70 cents per sbare, a 74% increase from \$16.4 million, or 40 cents ner share, one year earlier. Rev enue rose 27% from \$217.6 mil bun to \$276.4 million

COMPLITERWORLD

Executive Edit News Director Days Sands Senior Editors

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ant to the Editor in C ial Assistants

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## Nomad2 for PC opens windows on mainframe

Microcomputer 4GL offers file transfer to help access host data, develop large-system applications

BY CHARLES BABCOCK WILTON, Conn. - A persona computer version of mainframe fourth-peneration language No mud? incorporates cascading windows and file-transfer capa bilities for use in application velopment on a PC. D&B Com

Services PC Nornad employs the same mtax as the mainframe version of the product and includes a sewindowing techniques that help a user access mam frame data or develop applica-

announced

a according to Abby Pinard. D&B marketing spokesman. PC Nomad includes basic fileversion facilities for Lotus Development Corp. 1-2-3 and Data Interchange Format files. The facilities allow spreadsheets and graphics to be integrated into applications without leaving the PC Nemad environment. D&B snokesmen said.

A PC Nomad user starts out us a Command window, in which he enters his first statement is subsequently recorded in a History window. A series of statements slated for a new application are recorded in the

window and eventually tied together as the new application, Pmard said. Selections on a systems menu

bring up windowing options that enlarge, reduce and zoom in on a particular feature or pan across a undow. A windowing command allows the developer to choose standard colors, close or open and execute other basic window configuration tasks.

PC Nomad works in cor

with D&R's Beams on the main. frame for extracting data from Nomad? data bases and down

loading it to Ashton-Tate's Dhase II and Chart-Master, 1-2-3 and six other common PC apphcations.

IBM VSAM, IMS, SQL/DS and DB2 files. It also works with files Cullmet Software.

Dec 16 IDMS/R and Teradata Corp.'s relational bardware Nomad2 and PC Nomad are relational products capable of formulating SQL queries from their syntax and storing data in their own relational data base management systems, D&B offi

allow users to generate reports in a variety of formats. PC Nomad includes an active data dicfaunary PC Nomad retails for \$795

per copy and can run on an IBM Personal Computer XT, AT or spatible running IBM's PC DOS 3.0 with a 10M-byte hard disk and 640K bytes of memory The product will also run oo the BM Personal System/2 Models

30, 50, 60 and 80, running PC-Nomad is available for Nomad applications on IBM PCs. Beamit retails for \$5,000, D&B officials

The mainframe version of the fourth-generation language is cals said. The PC Normad List from \$45,000 command and related keywords \$120,000

## Big Eight

puting

principal consultant Richard Person pegs the growth rate of Bug Eight information consulting at 22% to 24% for that same no The MIS department is now

about business needs more than technology, and that is really the leg up the Big Eight has." Peter-son says. "MIS is worried about how its company is going to make money and that's what the But Eight as known for

Bee Eight auditing firms are increasing their computer-relat ed consulting practices with record investments in acquisitions hiring, research and training Significant acquisitions recent snelude Peat, Marwick, Main & Co.'s buyout of strategic information consultant Nolan, Nor ton & Co., Coopers & Lybrand's acquisition of Walter Ulrich Con sulting, Inc. and Deksite Has kins & Sells' purchase of Holland Systems Corp.

They have a tremendous ad says Gilbert Mintz of Broadview Associates, a Soft ware and services industry co lting firm in Fort Lee, N.1 They may deny a direct corr lation between the auditing and consulting sides, but when you are dealing with your own auditing firm, there is a certain rela-Horiship and rapport 'Our people are comfortable

dealing with senior manage ment," says Michael Bealmear national director of information systems in Coopers & Lybrand's management consulting ser vices. "Other services firms may be used to coming in at the level of newest leader or DP manager When senior management wants to be involved in systems deci sions, we don't have to make that cultural shift. In a way, the market has come to us, Dedicated professional ser-

vices firms such as Computer Task Group Inc., AGS Computers, Inc. and their smaller regional counterparts have seen

some Big Eight impact on their business, as have the service di visions of hardware vendors. But most observers feel that the intion systems consulting market is a very large one that will continue to get bigger.

### Conflicts of interest Bug Eight firms are well aware of

the potential conflicts of inter est, sometimes charged by their petitors, between auditing and systems design. But they strongly deny that their role as auditors compromises their consulting objectivity and vice

We don't do much work for our auditing clients, and that's not well understood," says Mel Bergstein, a managing director of Arthur Anderson & Co.'s management information consulting division. "The audit partners know we can make money on our own. They'll only intro duce us when it makes sense "[The controversy] is non-ise," says Robert Gilges, Pear

Marwick's partner in charge of the Nolan Norton consulting business. "Our auditors would never change the way they audit a system, no matter who had dened it. On our side, we have to be even more careful. We don't want to sooil an audit relation-Arthur Andersen is by far the

largest Big Eight player in the field, with a staggering total of 9,100 consultants and a chem list that includes the MIS opera tions of IBM. One industry follower has dubbed the Big Eight segment of information consulting "Arthur Andersen and the seven dwarfs." "The auditing seven dwarfs." ade of our business decided to invest in this business even be made sense." Bergstein says. "Thank God they did

Bergstein's division will spend \$110 milion in research and development this year -\$60 million in training. \$30 mil iton in academic research and prototyping and \$20 milhon on development tools and other software products.

We don't think the others an make it in this business. Bergstein says, "They got started too late, and this business renurses a lot of investment to keep on Pear Manuack is a distant No. 2 but fighting to catch up and using acquisitions as a tool to do so

The Big Eight's best market ing advantage is in very large development or planning projects according to George Rittersbach, a Peat Marwick partner in services. "We won't have the low bid on services priced by the hour," he says. "Large systems

Marwick's information system: consultants worldwole. At Coopers & Lybrand, cui

tom systems design evolved logcally from consulting. "In the mid-1970s, we'd draw up a mor report for a client, and, like most reports, it would sit on an execu-tive's desk," Bealmear says. 'Cheots were looking for actions, not advice. We had to be more proactive

Coopers & Lybrand recently came the third member of the Big Eight to join ADAPSO, fol-

### Staking their claims Recent examples of outright or partial acquisitions by Big Eight

Partner (Description Tube of deal Year ment Horiz 1986 Noise Norton & Co.

on systems

CHICARACTURE PROTECTION OF REPUTATION ASSOCIATES AND INCOMPLY AS AT

development projects are risky by their very nature. Clients want servicers who understand those projects in terms of their overall needs

Among Peat Marwick's MIS projects are the development of a comprehensive test system for West Coast utility's custome billing transactions and an analysis of the information flow within a national investment services

lowing Arthur Andersen and Waterhouse ADAPSO controversy over the potential conflict of interest for Buy Eacht firms has died down considerably, and ADAPSO says tt is actively courting more Big

"ADAPSO is no longer focused on that situation," says ADAPSO Executive Director George DeBakey. "We still hear

firm for the next five years. Peat some concerns united but we believe having them as members service employs about 1.400 is very important to our position as representing all the computer services industry

Big Eight firms are expected come under scrutiny later this ear in hearings before a U.S. Energy and Commerce Subcom mittee chaired by Rep. John Din gell (D-Mich.), a noted business watchdog. But the firms' role in technology consulting is not a major priority, according to sub mattee staff members

### Where the profits lie By most accounts, the auditing

business is not a high-growth in dustry these days. For the Big Eight to grow, their consulting businesses, of which information systems makes up a larger and larger part, must prosper. And at means MIS professionals will be seeing an increasing num ber of relevant consulting ser vices - everything from sys tems integration to custom applications development to net work management planning offered by auditing firms.

"Most organizations today recognize that whatever success they will enjoy in the future will be technology-based," says Vito Petruzzelli, a director in the information technology practice at Delotte Haskins & Sells. "When they discover the need for professional advice for planning that technology, they turn to those people who understand their hosiness. The Big Fight are viewed as something more than auditors: they speak the lan guage of their chen In a way, the Big Eight have

en good for the industry. Broadview Associates's Minta avs. "They're good players who set good standards and have convinced more and more MIS cliwithout insulting them. that they need belo with their planning. It's analogous to the payroll processing industry, which didn't exist before Automatic Data Processing, Inc. The mize professional services.

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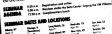


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zotions over a free lunch. mores over a more runner. We a lot of seminar. And a great apportunity for the forces of krw and arder



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need for host application soft-

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ware." Kalbsaid.

## DEC terminals retire VT240

VT330, VT340 overbower 4-year-old line, offer dual-session capability

BY NINAMARY BUBA MAGINNIS

BOSTON - Digital Equipmen Corp. last week introduced high performance terminals that en able users to conduct (win sessions over single or dual

communication lines The monochrome VT330 and color VT340 text and graphics replace emmals, will VT240 and VT241 terminals that were announced in 1983. said Jeffrey C Kalb, DEC vicepresident and group manager of low-end systems and rechnol More than 100,000 VT240 series terminals are in

stalled in the U.S., according to Dual sessions can be seen as-

International Data Corp. (IDC). a Framingham, Mass-based re-

The new terminals, which run up to five times faster than their producessors are fully compati ble with DEC's VAX computing architecture, support DEC's Re

gis and Sixels graphics protocols VT100. and provide VT52, VT100, VT240, VT241 and Tektronix, Inc. 4010 and 4014 emulation. the vendor said. The Regis protional replacement character set and 8-bit multinational chara support to accommodate all European languages.

the sevenn vermort stricty, a layered VAX/VMS product, users can conduct dual sessions from DEC and non-DEC systems including IBM manframes over a single existing wire, he To connect to an IBM main jarge New York insurance com

frame, the request from the ternunal is sent to the terminal server, which forwards the message to the VAX. From the VAX. the request is routed through the IBM Sextams Network Ar.

chitecture (SNA) gateway to the mainframe. The IBM response then sem back to the VAX through the VAX SNA gateway. to the terminal server and, final ly, to the VT300 series terminal

the vendor said. The session support utility have livense costs \$200. Proprierany firmware that enables the

utility capability on the terminal side comes standard with the 300 series products Another proprietary feature is the high-performance graph ics chips set that is used in DEC's Vaveration II/GPX workstations and is built into the 300 series. terminals for faster drawing

ternel and hapblishes an error

working on a project can share

speeds, the vendor claimed. The new terminals support either a mouse or graphics tablet, giving them workstation-like canabilities, the vendor said.

The Hamilton Standard Diviston of United Technologies Corp. evaluated two 300 series terminals during the past seven weeks and has placed an order for several hundred, said Poarce Hanks MIS director for the Windsor Locks, Conn.-based di-

on Standard has sever al VAX 8700s and VT240s in stalled. Healy said. The new terminals, promised to Hamilton Standard in 30 days, are part of the firm's expansion plans for its electrical degree and analysis engineering department, he re-

ported Healy cited the simultaneou Continued on base 9

CSP deflects FROM PAGE 1

ration language, Cross Sys tem Product, shows early signs of doing the same to fourth-gen ration languages." Webber, Inc. market research

report concluded. The pattern of the early re leases of CSP match those of "Severe functionality flaws, good performance and sol idiseeming underlying design. the report said.

was Version 3, anno sept. 8. 1986, that moved CSP forward as a contender in the ouages. Version 3 extended supto DB2. SQL/DS and MVS/XA, provided structured programming controls and addbatch-execution (acility

Though few users take advan tage of the capability, a CSP aplowing environments: CICS/VS. MVS/TSO VM/CMS. System Executive (SSX)/VSE 5668-825 and 8100/Distributed Processing Programming Exec In addition, a CSP application

can run under PC-DOS or IBM's Operating System/2 through the use of two products Essy Pren and Facy Run, that convert CSP to a PC-DOS application. CSP applications still can not be developed on a personal mouter, howe

Calming the critics Version 3 did nut silance all of CSP's entire

Shaku Atre of Atre Interna tional Consultants. Inc., a fourthgeneration language and inforin center consultant, said, IBM went to the closet looking for something it could call a fourth-generation language and come on with CSP "It proposed as a development language for the 8100 processor prior to being refurbished as a 370-family product in 1982 "It's too cryp

tic, it's for techies," she de-Another doubter is John B. Landry, author of the ADAPSO report on software development technology and chairman of Dis-

tribution Management Systems who said that for all IBM's talk of a strategic product, it has its own in CSP. IBM said it developed CSP applications for inter nal use and has some under development as products. Landry charged that CSP's price of \$42,000 to \$60,000 is tou high for it to catch on as a software development environment.

At this point, I can't figure out what the strategic fit of CSF

Landry said. However, one user, Brown Group, Inc., a St. Louis-based shoe manufacturer, has staked its future on it. "We've used Fo cus and other fourth-generation languages. But CSP is the only one you can use for production applications with DB2," George Merkle, Brown Group's director of information technol A spokesman for a large Nev

York bank echoed the remark "DB2 is our primary data base We use CSP for our MVS/CICS production applications. New production applications are being done in CSP as a sub

stitute for CICS Cobol, the spokesman said. The bank offi or rasked that he remain umden Evan anthonousty: marris cited

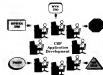
consumn problem, however Once a CSP application has been generated, it must be stored in a SP library rather than in ai MVS partitioned data set to which change controls are enforced on other production apple-

That is a critical problem We have our whole system set up for controlling libraries in par titioned data sets. The librar structure in CSP is all VSAM said a representative of a

geny that evaluated CSP and then drupped it for that reason Kay Mowery, IBM product nsanager for CSP, said the development language provides utilities for managing production code in its own libraries have not seen that as a significant problem in most of our user shops," he said

One experienced user of sev-

CSP kung in multiple IBM environments



fourth-generation guages has chosen CSP as its language for prototyping new products. David A. Duffield. hairman of Integral Systems, a Walnut Creek, Calif-based producer of human resource appl cations, redeveloped payrull and personnel applications in CSP af ter producing versions in Soft

AG nd North America Inc.'s Natural Applied Data Research. Inc.'s Ideal and Cultnet Software, Inc.'s Ads/Online Duffield said a CSP application has the advantage over oth er fourth-generation languages

in being able to run multiple customer environments. Also, his development staff prefers work 10/2 (0.15

routines, Duffield said. It's not as elegant as ideal. It

locks more like a combination of Basic and Cohol," he remarked. Programmers can run pro grams or parts of programs inwithout requiring their work to be recompiled for

each test run, he noted. CSP is an interpretive language with what Brown Group's Merkle termed a "dynamic hind and test" for development and a static, or higher level, interpretation for production version The latter runs more efficiently than those of other fourth-ger

eration languages, Duffield said. IBM's Mowery said users should expect CSP performance to fall comewhere in between ex-

He said it is easy to construct isting fourth-generation lan reens with CSP's magging fe guages and Cobol abity. CSP checks the syntax of a Landry said CSP's style of line of code as soon as it is encoding is similar to using a procedural Isnauge and "very close CSP establishes an individual to Cobol. You're not getting a lot of bang for the buck." IBM prod library for a programmer but gives him read-only access to manager Mowery said Landry's assessment was "too ve other libraries. One or more libraries can be devoted to comsimplified a comparison. ion routines, so that a team

Landry said the coding productivity gain with CSP was 2 to-1 against Cobol, compared with a standard fourth-generation language gain of 10-to-1. Merkle enticized the eight

character naming limit in CSI The spokesman for the New York insurance company that reviewed and rejected CSP said that IBM warned the firm that it should expect some perfor mance degradation as the num ber of of users increased. "It's a big memory eater," Landry said. It bogs down from contention when you get more than a

handful of programmers working with it. We have as few working as possible," Duffield said. Another criticism of CSP is that it highlights one error at a time, even when there are multi ple errors on a screep or in a line of code. Mowery said IBM is reconsidering its approach to error

highlighting Mowery also said IBM may have madvertently cast doubt on CSP's future in the wording of its Systems Application Architecannouncement on March 17. While naming SQL and C as standards for future application development, the announce-

ment referred to an application penerator "based on elements of the interfaces found in the existingCSP very sumble piece of the CSP programming interface as part of SSA. It's still a strategic prod-'Mowery said.

We feel CSP is relatively undiscovered, like DB2 once was Seventy percent of our custom ers have not beard of it." Integral System's Duffield added.

## Competitors shrug off DEC 300 series intros

BY NINAMARY BUBA MAGINNIS

Developers of terminals that are compati ble with Digital Equipment Corp.'s VT240 line said last week that the new DEC terminals offer few benefits over their existing products

We believe we're already a match for the 300 series," said Michael Kantrowitz, marketing director at Human Designed Systems Inc. in Philadelphia, "DEC hasn't really changed the price/ performance curve in the graphics terminal marketplace. That doesn't mean we won't offer VT330 emulation mode, but it

Kantrowitz said Human Designed Sys tems, which sells the HDS2200GY has offered twin sessions for more than eight

Human Designed Systems VT240-compatible terminal lists for \$1.595 and includes 1.086- by 800-pixel

resolution, about 50% more than that offered by DEC's new VT330 terminal. Kantrowitz observed. Wilsonville, Ore.-based Tektronox Inc. does not plan to clone DEC's 300 se ries terminals because its own 4100 and 4200 series graphics standard fills the bill. said Julie Nelson, Tektronix product man-ager of the 4205 and 4207 graphics ter-

Tektronix offers graphics terminals with emulation to DEC's alphanumeric VT100 and VT220 terminals, Nelson said. The Tektronix terminals allow two independent sessions with alphanumeric applications independent from graphics Because the terminals also emulate IBM's 3270 terminal and the IBM Graphical Data Display Manager graphics standard Tektronix users can link directly to IBM mainframes. Nelson noted, adding that the Tektronox 4205 terminal lists at

St. Louis-based Micro-Term, Inc. of fers a VT240-compatible Model 440 ter minal that lists at \$1,495 and offers signif scant performance and price advantages over both the VT240 and the VT330 claimed Dennis O'Donnell, Micro-Term 5 executive vice-president. He said the Model 440 is seven to 10 times faster than DEC s VT240

Micro-Term had been waiting for DEC to announce the high-performance terminals. O'Donnell reported. "In terms of a color market, we will be a participant est assured "be said

Micro-Term plans to announce dualsession capability within six months, according to O'Donnell who claimed there is no applications software on the market to take advantage of a

### DEC terminals

ons from two separate CPUs and the price reduction from the older 200 series termoals as important reasons for making the purchase.

Diane Farrell, a senior research anaiyst for IDC, commented, "The product itself is significant because it comes from DEC, and DEC controls a large portion of the terminal market and a large portion of the low-end graphics terminal market

Some new features, such as the 14-in screen, tilt-and-swivel display and nonvolatile function keys, are already standard in the industry, Farrell observed, "They had to play catch-up to the rest of the per-ple in the market," she added.

The new terminals are targeted for engineering, menufacturing, insurance, finance, education, transportation, government and utilities markets

### Unburdening the host To unburden the host computer the

VT300 terminals can reportedly store up to six screens of text or two full screens of graphics in resident memory. In dual-session mode, up to three text screens per session can be stored in main memory

The VT340's built-in color graphics editor gives users a choice of 16 colors om a palette of 4 096. While the current DEC LCP01 color printer cannot print the variety of colors on the screen, the vendor will soon announce a full-color printer capable of reproducing colors on paper as they appear on the screen, according to sources close to DEC

Communication speeds can be 75, 110, 150, 300, 600, 1,200, 2,400, 4,800, 9.6K and 19.2K bit/sec., depending on user requirements.

Both 300 series terminals provide resolution of 800 by 500 pixels, twice the resolution of the VT200 series. DEC said. The screens can display characters in a dense 10- by 20-dot matrix that appears as letter quality in both 80, and 132-col modes, the vendor claimed

The DEC terminals are expensive compared with VT240- and VT241-compatible third-party terminal offerings from such firms as Tektrony. Human Designed Systems, Inc., Visual Technology, Inc. and Micro-Term, Inc.,

IDC's Farrell said. The monochrome VT330 lists at \$1,895 and costs \$300 less than the re

tired VT240. The VT340 costs \$2,795 and is \$400 less than the VT241. Both terminals come with a one-year on-site

## At last...

### The time-saving, 12-in-1 DOS/VSE JCL manual

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manual. To illustrate: Suppose you're new to VSE and you want to enter a simple COBOL program using the VSE text editor, then compile and test it in batch. editor, then compile and test it in batch You'd have to wade through 6 different IBM manuals—2 to learn the basic JCL IBM manuals—2 to learn the basic JCI, statements and how to use them, one to learn something about ICCF, the interac-tive editor; one to learn how to comple the program, and 2 to learn how to use POWER, the spooling program, to sub-mute job in batch and get the output back from it.

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For ICCF users... DOS/VSE JCL teaches you enough about ICCF that you can use the that you can use the arous ICCF that you can use the editor for many everyday program-ming tasks. But if you want to exploit ICCF to the fullest, you should get a book called DOS/VSE ICCF It

covers advanced commands that give covers advanced commands that give you more control when you enter and edit text. Plus, it teaches you how to crease and use macros and pro-cedures that consist of a sense in commands for jobs you do again and again (then, you don't have to enter the commands individually each time you want to run the job)

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more than any other factor, determine whether or not a course is effective. And they are the missing ingredient in 2003 JCL courses—and in the IBM manuals.

### Who this book is for

who task book is for people who need to wrise DOS/VSE JCL. This stebules the beginning programmer who has had a programmer course for is staking a concurrent course in a programming language): the experienced programmer who is new to the VSE enprogrammer who is new to the YSE en-vironment; and the experienced program-mer. systems analyst, data control specialist, or computer operator who may be familiar with some parts of YSE JCL through experience, but who has never mastered it. So if you're running under YSE, this book is for you

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## MSA to widen scope of Info Expert

VAX, portable versions planned for 4GL-based system

BY ROSEMARY HAMILTON

ATLANTA - Management Science America, Inc. (MSA) announced its inten tion last week to move its Information Expert development environment beyond the IBM mainframe world to a series of other hardware platforms, including Digital Equipment Corp. VAXs and personal

A portable version of Information Expert is under development that allows the

cyclem to not on various hardware platforms, according to Philip Ross, an MSA oce-president attending the company's Interact meeting held here last week. The current software was written in assembler language to attain maximum performance on IBM mainframes, he said. MSA is currently negotiating with DEC to port the software to the VAX environment. "DEC has no pieces yet, Ross said in reference to the Information Expert components, "but I'd love to see it

Meanwhile, MSA is also involved in development projects with NCR Corp., Un-15ys Corp. and Honeywell Bull, Inc. to rewrite a portable version using Cobol and C. "I don't know the delivery date, but a rough one would be within this year Rose and While MSA as involved with the rewrites, hardware vendors will sell the software to their customer bases, he said.

Ross also said a version of one component, a screen painting facility, is running on a microcomputer at MSA. "We have a direction for PCs," he said, "but our plans now are still more focused on main

The appointment comes at a time when the Information Expert is enjoying a swell of appropriate from MSA's costomer base. Users interviewed last week gave the product high marks, even though most also said that the software still has its flaws.

Ross said MSA received 800 orders for the latest release of the product in just three week's time. Release 87.01, which molydes the first release of the system se. curity program, was made generally avail-

able April 1 Information Expert, first introduced in 1985, is a fourth-generation language based development environment made up of a data dictionary and a series of tools Some of those tools are now available such as the Evnert Retrieval and Report. ing component that allows users to gener ate reports with simplified, menu-driven procedures. Other components, such as a screen painting utility not included in the recent release, are now in beta-test sites. Also in beta test is a new version of the query tool slated for the next release. A new version of the Expert Link component, designed to download information to microcomputers, is scheduled to go out to beta sites within two months, the ven-

There's no question that the basic concepts are good, and, as the bugs are groned out, it'll become a very good prod-" said Timothy Latimer, a systems analyst for Communications Satellite Corn in Washington, D.C.

MSA designed the software to run on IBM mainframes and to work with MSA application packages as well as data base management systems. Extended-use ver-sions of Information Expert tools are available for users who wish to include their applications designed in-house or other vendor's applications in the infor mation Expert environment

Long before a personal computer version debuts, the current version still needs

fine-tuning MSA has been fulfilling its promises, but we haven't received the ultimate yet," said David Managault, financial sys-tems coordinator at Twin County Gro-

cers, Inc. in Edison, N.J. Mameault, who has been using infor mation Expert tools since early 1986, said there were "the usual bugs" with the system. For instance, he said, "there was some gitch with Information Expert and our CICS where screen aborts would oc-

casionally happen "You expect problems, and there were oute a few," said Kenneth Mathis, senior systems analyst at Uniax. Inc., a lackson. ville. Fla -based distributor of paper products. "But it's a good language, and it's easy to train users. We hope to one day use it exclusively

The fact that users are positive about Information Expert, despite its flaws, is a bonus for MSA. The company has actually been giving away the components since introducing the system two years ago oday, the company claims to have 2,600 Information Expert licenses.

But the bulk of those users aut ally received the components when they ordered an MSA applications package

Since 1985, 300 users have plunked down the \$50,000 fee for the extended version that would allow them to use the system with non-MSA applications.

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## Alliant widens FX net, graphics support

BY DONNA RAIMONDI

LITTLETON, Mass. - Alliant Comput er Systems Corp. is scheduled this week to release a spate of networking and graphics products that the its FX/Series supercomputers more closely to Digital Enumment Corn., IBM and Cray Research, Inc. systems and provide improved graphics output.

The new components of the networking product line, Albant Network Supercomputing Resources, will be released by the end of the third quarter, Alliant said

of its Unix-based parallel processing sys-tems, will tie the FX/Series into DEC en ments through an implementation of DEC's Decnet based upon Community from Technology Concepts, Inc. in Sud-

With the Decnet compatibility, DEC systems, as well as IBM Personal Com puters and compatibles, can log in re motely, transfer files and run program-toprogram communication applications on Ethernet The package costs \$8,000 for the FX/1 and \$14,000 for the FX/8. In addition. Alliant has developed

hery Mass

Digital Command Language (DCL). The emulation package allows DCL commands to be used to interact with Albant's Unix-based system. It is priced at \$6,000 on the FX/1 and \$10,000 on the FX/8. A \$995 emulator of the VAX EDT editor is

Our customers are typically those who have used VAXs for many years and are now running out of gas," said Phil Nersy, product manager for networking and graphics at Albant. "They want something that can be integrated quickly into their existing environments

And typically STEAMER will pay

for itself in about 3-6 months. (In one

case, a manufacturer paid back the

cost of our equipment before he paid

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Albant will also support Network Sys tems Corp.'s Hyperchannel high-speed network, which will allow the FX/Senes to function as interactive development and preprocessing environments for back-end Cray supercomputers, with data exchange at 50M bit/sec. Hyperchannel

support will be priced at \$14,000. Packet-switched networks using the CCITT X.25 standard and the Defense Data Network (DDN) protocols will be able to interactively access the FX/Series when that support is available in the third nuarter. The support ontion costs \$7,500 for X.25 and \$10,000 for DDN

Support of IBM's HASP protocol will ow allow FX/Series models to be con nected to IBM mainframes. An intelligent communications processor is used to offload protocol processing from Alliant processors. HASP support costs \$6,000. Synchronous communications modules are available for use with X.25, DDN and HASP support. The modules are priced at \$7.620

Alliant will also support two interac tive network graphics packages for Unix-based systems: MIT's X-Windows and Sun Microsystems, Inc.'s Network Extensible Window System. Support for both standards will be built into the FX/Senes Concentrix operating system and will not be priced separately. The firm also announced support for a

ute of graphics packages developed by Precision Visuals, Inc. in Boulder, Colo. They include the Siggraph Core-based DI-3000 and the American National Standards Institute -standard Graphics Kernel System-based GK-2000 package

### System freed

The networking and graphics and meets are a major step in Alliant's strateare direction to build narallel processing systems that can function as servers for large numbers of workstations and scientific computers, leaving those systems free for less compute-inte nsave tasks, saud Ron Gruner, president of Alliant

You can put up to eight 8600-class processors in the same box and have them operating in parallel. Then on top of that, you can put up to 12 interactive processors which are Motorola, Inc. 68020 based," Alliant's Neray noted. "The result is you can be running compute-inten save jobs on the larger processors while, at the same time, running network protocols or DCL emulation software on the in-

The Alliant line features a parallel optimizing compiler that restructures exist ong Fortran code to run on parallel proces-

For FX/8 user Thomas Stephenson manager of advanced computing technol ogy at The Analytic Sciences Corp. in Reading, Mass., the announcement has

immediate and far-reaching implicatio "We have VAXs running VMS and IBM mainframes," he said, "The ability for us to freely migrate from one to anoth er when appropriate is very important.

Formed in 1982 by ex-Data General Corn employees Gruner and Craig Munthe Alliant has been on a rapid growth curve during the past year. Its 1986 year end revenue soared nearly 600% to \$30.7 million. First-quarter results released last week showed revenue of \$12 million three times greater than the first quarter 1986 but just slightly below fourth-quarter revenue; profits, excluding a tax cred-it were \$1.6 million, compared with \$249,000 a year earlier.

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## Laptop market hit head-on by import tariff

BY MITCH BETTS

The U.S. decision to slap 100% tariffs on nported Japanese micros is a major setback for Tooluba america. Inc.'s fact call ing lantons and could pose problems for other importers if the sanctions last sex-

Many firms affected by the tariffs said they have sufficient inventories in th U.S to last a few weeks, but hinted they would have to raise prices or ston import mg if the sanctions last longer. Some importers and they plan to shift their many facturing operations to the U.S. to escape

Toshiba, however, already stopped importing the popular T-3100 laptop from its parent, Toshiba Machine Co. in Japan, according to Nobuo Ishuaka chairman and chief executive officer of Toubiba America. He and the tariff donbles the product's price and makes it un-

Toshiba's action could help sales of speting laptop and portable micros of fered by Compaq Computer Corp., Tandy Corp., Zenth Data Systems Corp. and IBM analysts said

Bill Kirson, an amplied for the Cartner Group, Inc. in Stamford, Conn., said the Toshiba laptops are feature-rich and have proven successful in the marketplace But Zenith and Compac are ready, will

ing and able to jump right in there and take that share." he said Toshiba's T-3100 accounts for about 20% of U.S. laptop sales so far this year, according to Raymond Falls, an analyst for Datapro Research Corp. He said that about 80,000 Tooluba units have been sold this year, out of a total of 400,000

ps sold so far this year The Reagan administration announced the tanffs in retaliation against Japan's alleged failure to enforce the U.S. Semicon ductor Trade Agreement negotiated last year [CW. April 20]. The trade sanctions became effective April 17 and will be lift ed once the U.S. gathers statistics show ing that the semiconductor trade situation

Optimists hope the trade dispute can be resolved during Japanese Prime Mine ter Yasuhiro Nakasone's visit to the U.S. this week, but some U.S. officials have catel it will take about three worths for the lapanese to show significant improve-

Tried to minimize effect reported from Japan, a total market worth about \$180 million, as well as pour er tools and color televisions. The Reagan administration said it selected product categories that have domestic or other foreign suppliers to minimize the effect on

S. consumers One of the affected vendors. NEG one Electronics, Inc. in Wood Dale, Ill., plans to continue importing its Multispeed laptops and APC desktop micros from Japan but eventually will be forced to raise prices, according to Marino Black-Ruffin, manager of marketing communi-

We're investigating ways to reduce our manufacturing costs in order to keep any price increases to a bare minimum, We're lucky enough to have inventory available at our current pricing, so we youn't have to impose any price increases.

for a few weeks " she saul The tariffs could have been a major setback for Epson America, Inc.'s Equaty hne of personal computers - which have ghly 5% of the U.S. market for PCs but Epson apparently saw the tariffs coming and took evasive action

Andrew Leonard, Epson's director of corporate planning and communications. said the firm imported enough stock prior to the April 17 announcement to last two Toshiba's decision to stop importing

the T-3100 creates a small problem for Grid Systems Corp. in Mountain View Calif . which appropried Appl 13 that it would sell a version of the Toshiba lanton called the Gnd 286.

We just introduced it. We haven't gotten rolling on the thing yet, so the im

### Japan: Tariff plan 'defies logic'

sociation of Januar (EJAI) denounced the U.S. trade sanc tions as premature and said the decision "defies logic" be it applies tariffs to Japanese products other than senuconductors the product at the center of the U.S. ernment is not allowing sufficient time laton trade dispute.

U.S. officials said the tariffs were arelied to Japanese microcomputers and other electronics products, rather than chips, to avoid harming U.S. firm that depend on Japanese chips for their product

The trade dispute concerns the U.S. Japan Semiconductor Trade signed in September Agreement 1986. The U.S. government charges that Japan has failed to live up to two parts of the agreement: to stop selling thips at below-cost prices in foreign markets and to open the Japanese market to U.S. chrp suppliers

The U.S. contends that Januar has nown no progress on either front thus propardizing the health of the U.S. semiconductor industry, Japan claims the U.S. is expecting results ton soon and is ignoring its reform efforts "It is regrettable that the U.S. gos

for these results to became apparent before making this premature decisaid Shoichi Saba, chairman of the EIAL in a statement. The U.S action was praised by the U.S.-based Semiconductor Industry

Shortly after the Reagan admir tration rebuffed last-minute pleas from lagan and invoked the tariffs, the large take the dispute to the General Agree ment on Tanffa and Trade, the inter national compact that regulates world

MITCHIEFTS

line is not significant at this point," said Ed Murphy. Grid's marketing manager In fact, the tariffs on Japanese laptop could have a positive effect for the bulk of Grid's product line, which is manufac tured in the U.S., he said

Also affected is Wang Laboratories Inc in Lowell, Mass., whose lapton is manufactured in Japan by Brother Indutries. Ltd. 'We feel we have enough of an inventory in the US already to meet ourfor the immediate future said spokes

nun Paul Henning Dan Infants, manager of corporate marketing for Sharp Electronics Corp in Paramus N.J., and Sharp's three Pt. models are covered by the tarifts "If it's fesolved over a period of weeks.

Continued on page 18

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## Memorex joins 3480 tape drive battle

BY JAMES CONNULLY

MILPITAS, Calif. — Memorrex Corp. is scheduled to make its entry into the IBM 3480-composible cartridge tape drive market tomorrow with a drive and controller than are priced the same as IBM's but contain the bundling of 750 tape cartridges with each dual-transport drive. The ammoniscentent will be the first.

The announcement will be the first major storage product introduction since Unity's Corp. sold its Memorex subsidiary to a group of Memorex executives list fall, although the company said more storage.

age and terminal announcements are dueduring the next two months. Memorex officials said the transition to a stand-alone company is almost complete, and they expect to generate \$1 billion in revenue in

the fiscal year ending November 30.

The Missauce Stello is shoulded to build perform the Missauce Stello is shoulded to build perform the third quarter. Memore product marketing manager Heiners product marketing manager Heiners J. Carranko noted that although IBM delivered its first 34806 more than two years ago, the start-up time is lengthly for any play, composition manufactorier (PCM) tape product and that those products have lengthly offer the product and that those products have lengthly offer the product and that those products have being life cycles. "Hom't think we are late-

We're not the first PCM to ammounce, but dion't think there will be a whole lot shipping before summer." Cueraño said. Uniñe PCM compettor Storage Technology Corp. Memores is not ammouncing an automated Bhrasy feature for its 3480-compatible drive. John C. Scott. Memores we persedent for marketing, said the company summer what type of barry feature it eventually will offer. The 5480 is made in Japain for Memores by Fqistis U.H. The product is

functionally similar to IBM's 3480 except

that the Memorex product supports eight

channels rather than four and atcludes

features such as a larger buffer and larger display. A maximum configuration supports two controllers, 16 channels and eight drive subsystems, each with two tape transports.

But while the IBM and Memores prod-

tage transfer the BM and Memores products or similar. Homores is emphasizing its added value, better product rehability and the ability to sapply its 1-year-old Toughthell 34-80-compatible cartridges. Carenno said Memores retains a price advantage against BM by bunding those cartridges with its tage systems. The eminium configuration, consisting of a control cuts, a dual-drive unit and configuration through the configuration with two controllers, eight

dual-drive modules, 6,000 cartridges and

a two-controller switch, costs \$479,550.

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### Low-priced laser printer hits market

BY ALAN ALPER

NEW YORK — Setting a new entry-level price point for Hewlett-Packard Co. Laserjet Plus emulation, C. Itoh Digital Products, Inc. lists week unveiled a 5 paper min lister pointer listing for \$1,795

Amed at personal or small department is usage. Clab's Jet-Setter comes with 512K bytes of memory, which enables it to accommodate applications requiring the integration of text and graphus, and features 300 ofthm, resolution. The laser pinter will be available through Ct. 10th is top 550 resellers beginning in July, noted Frank. Revaeh, product marketing minager, who said the form so flering margins.

m excess of 40%.

Jet-Setter's list price of \$1.795 is \$700 less than the list price of HP's Laserpet, which operates at 8 pageinin and is \$160 less than QNA, line's low-end laser primer, Kiss, Okidata offers a low-end laser primed at \$1.795, but it requires 120K bytes of additional memory and an additional memory and an additional price of the product of \$1.000 less of the price of \$1.000 less of \$1.000 les

"They're definitely the price leader," noted Charles LeCompte, editor of the "Printout Newsletter," referring to C. Itoh, "It's just a question, though, of how long it lasts."

LeCompte said that Okidata is expected to reduce the pince of its lisser printer with Laserper Plus emulation to less than \$2,000, while some HP dealers are already offering the Laserpet Plus at about \$1,795.

C. Itoh said it is aiming its initial printer at low-volume print environments where users are running standard business applications.

"The 6 to 10 page/mm market is wellsaturated." Rexach said. "We're aming our prodoct at the general-basiness user who uses a dot matrix or a daisywheel printer and is interested in getting in on the laser revolution."

The printer comes standard with Centronics Data Computer Corp. parallel, RS-232C serial and RS-422 interfaces. List price includes toner, users manual and a one-year warranty.

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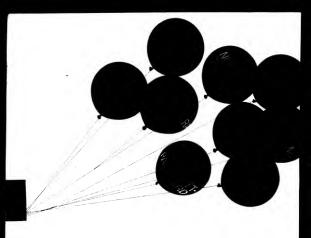
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to see why smart terminal buyers are clearing their desks for the new OPUS 220 from Esprit. For the dealer nearest you, call toll free: (800) 645-4508, New York State: (516) 293-5600.

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## AT&T joins PC compatible price cut parade

BY ALAN ALPER

MORRISTOWN, N.J. - Responding to changing market conditions. AT&T last week conditions, AT&T slashed proces up to 38% on its line of IBM Personal Computer compatible micros.

AT&T thus joins Hewlett-Packard Co. and Epson America. Inc. in cutting price tags in reaponse to IBM's price reductions on selected mod Is of its PC fam-

dy [CW, April 20] AT&T said the price reduc tions are in response to market treads and are armed at recon-

ment to remain competitive in the PC market place.

The steepest reductions wer made on the 80286-based PC 6300 Plus line, as AT&T cut prices between 27% and 38% single-floppy-disk model less for \$1.590; the dual-floppy

ts \$1,740; the 20M-byte bard-disk, 360K-byte model is proced at \$2,240; the 20M-byte hard-disk, 1.2M-byte floppy hsts for \$2,340; and the 40Mbyte hard-disk, 1.2M-byte floppy system now costs \$3,065. Tom Roberts, an analyst with International Data Corp., a Fra-

mingham, Mass.-based market research firm, said the drastic price cuts on the 6300 Plus line indicate that AT&T may be withdrawing the product from the market The system, he pointed out.

has not enjoyed overwhelming success, primarily because it cannot accept standard 16-bit PC AT-compatible boards and does not use a standard monitor

It appears as if they are clearing out inventory on the product. Roberts said probably will be replaced by the

The price cuts on the 6300 family, be said, align AT&T's prices on low-end PCs with the rest of the industry. "They're treating PCs as if they're a comdity," Roberts commented. AT&T cut prices by between

17% and 23% on its PC 6300 line. List prices for the product family are \$1,485, \$1,565 and \$2.165 for the single-floppy dual-floppy and 20M-byte hard disk models respectively

Prices for the 6310 family were reduced by about 5%. List prices for the product line are \$2,900, \$3,800 and \$4,700 for the 1.2M-byte floppy, 20M-byte hard-disk: 1.2M-byte floopy and 40M byte hard-disk; and 1.2M rsions, respectively. ATAT did not reduce proceson various options such as key

boards, monitors and display In addition, the firm is extend ig its warranty period for the PC 6300 line and associated per pherals from three months to one year. AT&T already offers a one-year warranty on its other

# A SPLIT PERSONAL

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## microcomputers Laptop

it'fi just be business as usual. If it goes on for months and months. then you jeopardize your sales network. Infanti commented.

**Tariff exemptions** Data General Corp.'s DG/1 lap

top manufactured by Nippon Data General Corp. in Japan, 15 exempt from the tariff because it uses Intel Corp.'s 80C88 chip. according to Ed Russell, spokesman for the Westhorn Mass. based firm. The U.S. Department

Commerce informed DG that the tariff applies only to laptops with the Intel 80286 and 8086 chips but not the 80C88. Russell

Likewise, the Z-181 laptop sold by Zenth Data Systems, a unit of Zenith Electronics Corp. in Glenview, Ill., also is exempt even though it is made in Japan by Sanyo Electric Ltd.

Zenrth spokesman Glen Nelsaid the Z-181 uses the 80C88 chip, which acts as an 8bit chip.

## Multiflow rolls out minisupers

BY ALAN ALPER

NEW YORK - Offenng a less ave approach to high speed computing that leverages inconventional technologies on a single processor, Multiflow Computer, Inc. last week offinally unveiled its family of Unixbased ministracromouters.

Multiflow's Trace family of computers — priced between \$300,000 and \$1 million and aimed initially at the scientific and engineering marketplace makes use of very long instruction word architecture and a compacting compiler. The approach reportedly allows Trace to pack an instruction word up to 1.024 bits wide, enabling as many as 28 operations to be eve-

Other computer manufacturers have used a variety of methnds to achieve high-speed processing. Firms like IBM and Cray Research, Inc. are using faster circuits, which is inherent y expensive noted Joseph A Fisher a Multiflow colomber and executive vice-president. A host of other vendors are using multiprocessing or parallel prooessing. This only accelerates the processing of compute-intensive code, which can be vectorized, but does not speed up

the scalar processing of support code. Fisher said. Multiflow's method uses overlapping execution to speed up the processing of both comse-intensive and support code. Fisher said. "Users can now get a speed up whether an application is dominated by either type

Multiflow's compiler, called Trace Scheduling, gets around conditional jumps, a problem as-

sociated with overlapped execu tions. It picks the most probable noth that the code will take and adds compression code for ose lines that do not follow The code is then compacted into very long instruction word archi-

or Fortran will run on Trace. Fisher said which enables the system to be dropped into an existing computing environment without rewriting any code. The three-member family runs an enhanced version of Uni versity of California at Berkeley ware using the VMF I/O bus

The systems support a variety of ectivity alternatives including Ethernet, TCP/IP, Sun Mi crosystems, Inc. Network File System and Decnet The Trace 7/200 packs seven operations into one 256-bit instruction and will be available in late noted Robert South vicepresident of sales and market-

mg. The Trace 7/200 is priced at \$299,500 and includes 16M bytes of main memory, expand able to 512M bytes: VME I/O processor: a disk controller and 515M bytes of Winchester disk storage and a cartridge tape

The Trace 14/200 will pro cess 512-bit words and execute while the Trace 28/200 will pro cess 1.024-bit words and 28 on erations simultaneously, Multidebut in the fourth quarter. Smith declined to provide pro jected pricing or specify the de were dates of either system Initial beta-test users include United Technologies Corp 's Si-

korsky Ameralt doeson in Strat-Conn., and Gramman Corp.'s Data System division in Woodbury, N.Y Multiflow will most closely

compete with minisupercom puter vendors Convex Computer Corp. and Alliant Computer Sys

Dataquest, Inc., the San lose Cald., market research firm. predicted the combined market for supermun, numsuper and su percomputers will grow from \$6 billion last year to about \$14.5 billion by 1990. Based on the henchmark results, which show Trace/200 operating at

about 28 million instructions per second (MIPS) for a \$100,000 omputer, compared with comntors such as Albant, Convex. Cray, IBM and Digital Equipment Corp., whose machines are MIPS for a \$100,000 system analysts remain unbeat about

Multiflow's prospects. "The single most important thing is price/performance, and it seems as if Multiflow did their noted Marco Brooks, an analyst with International Data Corp.

## AIIM'87 sets stage for optical storage debuts

BY JAMES CONNOLLY

NEW YORK - Networking capabilities for optical storage sys tems are expected to be among the key product introductions when AIIM '87, the Association for Information and Image Management's conference, open-

The show also is expected to provide a forum for Wang Lab oratones, Inc., Plexus Computers. Inc. and Eastman Kodak Co. to display recently announced mage-management systems de-

signed to allow computer users to have on-line access to images of paper documents According to AIIM officials, 15,000 attendees and 173 ex-

hibitors are expected. Filenet Corp., which last week introduced a \$195,000 entro-level configuration of its document-image processing system, reportedly will announce several peripherals and an open systems architecture strategy

for its family of document man agement systems Laserdata. Inc. is scheduled to announce I/Net, an Ethernet-

compatible electronic-document management network. Laserdata also is expected to support Optical Storage Interna-

onal's inkeliousistic (ierus) Disk Storage and Retrieval Unit Those moves are intended to provide Laserdata's Lasers www personal computer-based docu ment management system with larger than one milion docu ments. Laserview systems are priced from \$50,000 the sendor

Micromedia, Inc. will be dem onstrating its Optical System 100 stand-alone electronic imag ing system, which uses compresion techniques to store 60 000 to 80,000 letter-size images on 12-m double-sided write-inco read-many-times ontical disks Micromedia said the system is base priced at \$94,500 and in cludes an AT&T 3B2 componer and a Kndak IMT-350 my room

Other announcements ex pected at the conference include Bell & Howell Co.'s introduction of a personal computer-based image search system, a high speed paper scanner, a film scan ner and an electronic parts cata log system.

In addition. Formative Technologies, Inc. is scheduled to an nounce a system to scan and digcomputer-aided design drawings for storage on optical disks

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find anywhere else

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### **EDITORIAL** Reveille

urking beneath and being pulled along by the tidal wave of personal computer announcements unleashed by IBM earlier this month is perhaps the most significant challenge MIS has faced in a generation the management of microcomputing.

What?" you say. "Haven't we been doing that for years?"

Well, in all too many organizations, MIS had until recently managed to leave microcomputer systems planning to others, namely those with the intestinal fortitude to deal with the burgeoning legions of end users. That arrangement

worked fine as long as those novice users were content working on individual projects with individual files at individual workstations. Then the level of end users' sophistication grew, as did their desire to interact more with one another, with shared peripherals and, final-

ly, with (gulp) min. and mainframe files. Slowly but mexorably, MIS began exerting its influence over the micro systems being built around them. In some companies, this influence became a formidable barrier to the probferation of information systems; in others, more thought-

ful MIS managers helped pave a smoother path. Even the personal computer weekly papers have lamented in feature articles and editorials the diminishing role of the so-called micro man ager, who increasingly is subordinate to the MIS

infrastructure within information organizations. The announcement of the '386' generation of micros and new operating system standards will hasten the need for MIS to assert its preeminence in specifying computer systems. These systems will increasingly be built around micro processor-based hardware and become part of increasingly integrated information networks.

We are already seeing proof of the growing control MIS has over the planning and acquisition of micro-based systems, and with good reavin. Of the \$42 hillion spent on hardware purchases by U.S. businesses last year, more than half went to pay for micros and other small systems outlays. That is why a recent Computerworld study of 2,000 computer sites showed MIS to be the primary department in controlling and specifying personal computers in 75% of the sites, with the remaining 25% scattered among several other departments.

The challenge is not in gaining control but in making the micro-based systems work, systems that will eventually replace the traditional minis and mainframes as the primary systems building blocks. Micro-based network solutions developed during the next few years will make it possible to build total information systems serving more users far more efficiently than today. Successful MIS professionals will light the way toward this next generation of information sysms. Others may try to impede the inevitable. and eventually be swept aside.

To quote an aphorism used by Computergorld columnist William Zachmann, "The lightning said to the oak tree, 'Stand aside, or take what is conting to you.

ALI DIGHT KID. BEAT IT! WE'RE THE NEW CHINERS 100 top 500 for :Irate users scuttle Uccel plan to dent ADC2

Dealers and Lessors Association

(CDLA) IBM Relations Commit-

tee, Chairman Richard A. For-

sythe reported that IBM Credit

Corp. had 19,000 senal-nur

bered machines reach end-of-

lease term in 1986. He further

reported that these 19,000 mg

chines were remarketed primar-

ily to the current user and that

that IBM salesmen resold all

This week

in history

Magnetic bubble memories

have found their first com-

mercial application in the

computer industry, but not in

expensive mainframes. Texas

Instruments, Inc. has inte-

grated the mass memory storage medium into Iwo

automatic send/receive ver-

sions of its Silent 700 series

terminals following a three-

Six 23-year-old computers

may prove to be a real gold mine for the U.S. Air Force

Attended to salvage the first

of six aging processors could

\$1.5 million in precious mei

yield between \$225,000 and

als, principally salver, gold and

platinum, used in the solder

and as connectors

vest laboratory effort

April 26 1982

April 25, 1977

### LETTERS TO THE EDITOR CDLA facts

In Ray Saperstem's appeal to the pany employee JCW, March introduced into an already comolex tax usure. The argument Saperstem presented in his letter. Paycheck envy," was based on the premise that the employee was shooting himself in the foot endorsing Section 1706 of the

Yet another twist

Tay Reform Act of 1986 Section 1706 perture to the ray withholding status of the independent contractor and threatens the "enviable" takehome pay of those independe contractors in technical fields who emov what the IRS feels is a little too advantageous of a status. From the brokernoe houses of independent contractors who can underbid the labor rates of the fully compensated employee to the undergoid professor who moonhights as a technical consultant, this IRS issue has ignited corks in the hearts (and wallets)

Saperatein is president of his company and an independent consultant. If Section 1706 has its victims, I doubt it will be Sa perstein. Otherwise, his editional would have centered on issues of (airness and legality. Instead, he urging the technical entologies work force not to rock the boat by supporting Section 1706 Superstein's article was

meant to cloud over an IRS issue with emotion, then I'm sure it was an effective tactic. If, on the other hand his letter was a oncere effort to make his oppo-"see the light." then he should rethink his assessment of

John Power Delex Systems, Inc Vicana Va

19,000 units. This is untrue IBM salesmen did remarket a An article about IBM's sales of few machines to end users as leased hardware ICW. April 61 "set ones" units to on-order new IBM machines. The number was contains perificant inaccuracies At a meeting of the Computer

The article also reported that IBM Credit is a dues-paying member of CDLA. This is not

true lames F Benton

President CDLA Washington, D.C.

### VM, X.25 role the balance were used for IRM internal requirements or resold to computer dealers and leasing companier. The article indicates

I'd like to take exception to Rudolf Strobi's comment in your artude "Screen trobten on 4381 ICW. Feb. 91, which indicated that VM would not be used on high-end 9370s because of a lack of X.25 support

VM presently has three sys em connectivity tools: Pass Through Facility. Remote-Spooling Communication Subsystem (RSCS) and Transparent Access Facility, Each of these products supports channel hannel adapters for local CPUto-CPU connections, or binary synchronous lines for remote CPU-to-CPU data communica

The majority of comcontemplating 9370s already have their own private network Therefore, the statement that VM "... is [not] well suited in the high-end 9370" because it does not support a public-network access method, X.25. sam ply does not make sense. Of course, there will be some use of X.25 in a VM environment, but in the grand scheme of things, it is likely to play only a minor role.

Ronald P Kral Sensor Vice-President, Stratemy Marketing VM Software, Inc. Reston Va

COMPUTERWORLD

APRIL 27, 1987

## of office automation

In a refreshing burst of candor. Anthony Wasser man, editor of the Association for Computing Maty's (ACM) Computer Sur sex. admitted that despite the goal of publishing articles "comprehensible to the entire reader

hip, that goal is not always at-So true. The latest Robert Ludium novel Computer Sur eris is not. But in the June 1986 issue, which arrived about nine months late, there is an article that, although fly-specked with bibliographic references, is not only readable, but presents an interesting approach to what the author calls "office automation

We will use this term since the The paper is called "The Elfect of A Priori Views on the Socal Implications of Computing The Case of Office Automation The author is R. A. Hirschheim mation Management in the UK If you can get past the title

without terminal ennui, you'll Authles, a turney edone of Easternoon magazine is an industry consultant curretally acting to editional advocer to Pa trans Newbold & Philos Sustems Green

unfolding: the world according to Hirschheim

What he did was survey the hterature on the impact of office automation, noting, nately, that which has appeared is diverse and contradictory Hirschheim observes that there are those who are office automation usberong in a new age of productivity, job satisfac-

tinn and office modernization There are also those who darkly claim that office automation brings with it a deskilling of the worker, drudgery, a degradation of professional achievement and the end of personal privacy. Rephty is not the essue here

the author claims. What is really going on has more to do with the a priori beliefs and values held by the observer rather than empty cal faces Hirschheim classifies humans into three camps: optimists, peysimists and relativists. He then

examines how these life postures affect the point of view taken by contributors to the office tionliterature He comes in this point: The optimist sees technology as a

tool and man at the crafteman The skilled craftsman will use the tools to be and mankend's benefit, and the relationship be-Continued on page 24

## **Taking a global view** Gyring and gimbling in the wabe

'Sensitive but unclassified' information comes in from the cold

JOHN CLEMENT

When I read in the papers that the Department of Defense was calling for the creation of a new category of "sensitive but uninformation seemed like a good idea. There's too much information going around nowadays, anybow, and not enough controls on it. But still, I thought I should Speaker of the House Jim Wright calls a "balanced opinion," so I

invited Larchmont to lunch. Larchmont works over at Commerce in one of those trends electromes fields No sooner did Larchmont sit down for his crossant and tolu

"Calm down, Larchmont" 1 said "No one's booking at us, and besides. I can't believe you can do so much with so little. Are you sure - with rainfall data?" Are you kidding? We're talk

ing Class VI machines and the best inference enames. And what's coming up in the future is ven scarrer. There s fulks at the Naval Laboratory that will be able to plot the course of history for the next 50 years by sust looking at the wear patterns on a neasont's sandals. By now, I was getting a little

worried myself. I had no idea the problem was this serious Larchmont." I said. should we do - develop a new

e you mant to talk about ramfail in Kansas, but you want the information to be sale mine mation. Well we have a whole new rainfall water based on what do you call them: - meta phors. At one level it « " a gentle flow", at another "a raging tor rent for anything in between 5s if you want to tell farmers what to expect you simply issue a press release stating something For the coming wasen the ventle flow of rain will be un

"And the beauty is our last est machines can't decode the stuff, not even with the best natural language programs. And when you think about putting different kinds of data together, the



## The PR dance: Shuffling off to be buffaloed

deadline





newsroom clock I detect the slightest wensa both of sweat at the tips of my fin gers as they rest on the boxboard. The blank VDT screen stares at me intensely. I swear it whispers, "Feed me

The stack of scribbled notes has motionless - and incomplete - on my desk. I had talked to users about the hot resuc 1 had vatheted a gaggle of consultants to create perspective And what is left? The vendor.

Going to the vendor means a ade trip to the public relation office - that port for stories lost

Reporters and PR make odd hedfellows, consistently wanting Miles and Section Editors of Companies

diametrically opposed times PR people for example have an unconny way of calling with a story to pitch as the deadline hour looms overhead like the Goodyear blimp. Conversely, when the reporter calls with an inquiry. PR utters its famed rewind I'll see what I can do " In France, that means "au revoir, So I pick up the phone and call a PR contact at HITECO (High-

and needing each other only at

"OK." BITECO press relations specialist Sam Nogettinthrume says, "let me get this straight. You want to speak with someone about the commany's direction on this score That's right. Treply

"Now, you realize that we at HITECO cannot comment on our future products? Well, ves. but I don't need a

specific product here as much as a sense of corporate strategy." insist, feeling savvy and strong Continued on page 24

than I credit use he was concerned. In fact, he looked awful - bogs under his eyes, the archety pe of the desperate bureau-

No. I'm not testifying on the Hill," he told me. "But I don't mind telling you, I'm worned The Russians aren't sending stres over anymore. We're usl giving out the information for free, and they can nick it on with a Parky Shack 100 and a guarter for the pay phone

"I thought that was why we had security classifications."

named than ever. "You was don't understand. Computers are getcan't imagine the inferences that can be made from tiny amounts of the most harmless data. Take some figures on average rainfall mix them with traffic patterns on Midwestern second-tier high ways and not them in your Crus

Bango! You can predict optimal targets for infantry invasions of what it used to be Kansas - and that's top secret His eyes gleamed feverishly I shouldn't even be talking about

Generalis a Washington D.C. shaws server of the computer industria COMPUTERWORLD

We tried that We sent up a irial balloon, called it "Senstive but Unclassified Information But the bleeding hearts from all

over somed with the Information Industry Association, of all people - we thought they were our friends - and made a terrible atmk. We decided we need a more robust solution Larchmont gradually lowered his voice "You didn't get this from me, neht? But some of us

think the government's going to have to invent a whole new kind of information: safe information Have you heard of Form E1a? Incided vaguely, not wanting to admit ignorance of a new heirs word going around.

A few of us," Larchmont said, "have been working on a new was to express government data. You see, the problem is mostly with the numbers. If you an get rid of the numbers, what you have left is safe information Then spring can go back to being

We don't need numbers, you see, if we can come up with the right images. And our research boxs have found plents of them

mus. What do you make of In the raging torrest on the plantbulking shapes meander the bu-That - the data on root use patterns combined with the runfall information. I tell you those Red computers will him their motherboards' And here another on our five-year de fense budget projects. Twabriller and the sixths toom de-

By then Larybooms & you was at a near-shout. The shadnws figure in the trench cost two tables away shork his beau rapped some sheets out of he notebook threw his pencil down Who that sounds like oute step, ult forward I muttered

But do we need a new security clearance system with all this ogress going on' You bet we will beneated Paraphrased Secret Metaphoro and for the really big stuft -Top Allegorical Right new to CIA's entire humanities staff is working around the clock on this

We : e even and worke of George Will s top people under

## World view

CONTINUED FROM PAGE 23

it of master and slave Ah, but the pessimist does not buy that. For him, technology is the governor and man is viewed as the machine in the service of technology, technology is the master, man the slave.

The relativist sees technology as mert matter and man as the gatekeeper who decides upon the type, quality and quanti ty of technology introduced into the system. As Hirschheim says, this latter relaturnship is more symbotic. Here he time his hand: The author is on the side of the relativists (and the relativists are on the side of the angels).

ter is just an acad paces, that there is no relevance to the world in which you work - a pragmatic nvironment in which you must make darcations and the like. But stop a minute and asic yourself: Given the definitions presented here, are you a pessimist, an opti must or a relativist when it comes to makmg data processing or office information decisions? How does your world view. your weltanschauung, affect you and

If you're an optimist, you probably see office automation as a boon leading to productivity increases - an argument, Hirschheim comments, that is well supported by experience. Technology, you

You might object that this whole matfeel, displaces some people but gives rise emic going through his to new jobs directly related to the new technology. Office automation relieves the drudgery inherent in old-style office work and facilitates such benefits as flexible working hours and working at home.

The pessimist as drawn by Hirschheim has a Marxist cast. Information technology "is seen as the latest in a stream of tools and techniques used to maintain control over the working class." Unempinyment is inevitable, jobs become de meaning work at home is isolating and

communication flows upward to management only. Privacy goes out the window. The relativist argues for participation from all concerned to decide how to use an pherently neutral technology. "For of fice automation to be considered accept-

able, it must meet specific social and ethical conditions," the relativist says.

In the last analysis, Hirschheim says, optimists and pessimists share a deterministic world view. Underlying their belefs is "the clear, uncompromising view of the growth of technology. It is unstop pable and fundamentally uncontrollable. The relativist, however, feels we can control technology and advocates participation of the "affected parties

The world according to Hirschheim deserves to be investigated. It could be that the exposure will bring you a new level of awareness of your own predilections and peccadillos as you go about your dayto-day business, making decisions, deter mining people's work lives and being at large in the world



"Hmmm," Sam says. "What is your deadline This, I knew, was Sam's first move on

the chessboard "I've got a 3:00 deadline to get this in

Monday's paper," I reply firmly.
"Oh, come on," Sam sighs, "It's 11:00 now. How do you expect me to set this up that fast The story just broke this morning." I

argue. "There's got to be someone who can comment in the next four hours. "Well, I can't promise anything, but let

me see what I can do," Sam says emptily. The last time Sam told me he'd see what he could do, I didn't hear from him for two weeks. When I tracked him down on that occasion, he clearly had answered har phone harmatake

He pleaded amorance, "What was it you wanted again?" he asked. "Oh yesh, right Well, you know Caddell was trans ferred last week, and I tried to put you in touch with Johnson, but he was in Europe and his assistant didn't feel comfortable with the interview. And, of course, we've reorganized that department, so it really doesn't fit your question anyway. But let me see what I can do, and I'll get back to you by 4:30.

Four-thirty came and went that day The next morning I called Sam's office again. "Oh, Sam's gone to a two-week training course off-site," his sweet-voiced secretary said. "Is there anyone else who can bein you, sir

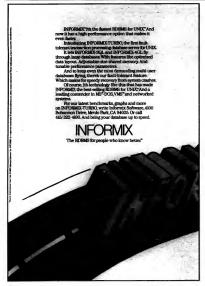
Yes." I replied then. "Do you have a career counselor handy?

Today, learned and wazened, I don't let Sam slip so easily into the unreachable netherworld of HITECO. "I'll call you in an hour to see what progress you've an nour to ac-made, "I suggest. I think I hear laughter but can't be sure. "OK fine " Sam says smugly. "And

by the way, you know we usually want these kinds of questions submitted m writing beforehand I consider the options. I can tell my editor that a stray dog came through the

newsroom and ate all my notes. I can tell him I sent the story to him and the system must have gone down and lost it. I can get on my knees and cry on his shoes. "OK, Sam. You win, Give me a stat ment," I mutter.

"I thought you'd see it my way," he says. "Here goes: 'HITECO is committed to maintaining its position in the industry by providing our customers with the best tools available...



## **SOFTWARE & SERVICES**

## TALK

### Charles Babcock 4GLs seek relationship

When the the Defense and Electronics Center of the Was tinghouse Electric Corp. in Baltimore wanted to case the street of reporting on a federal contract, it installed a fourth-gener ation language to use with its relational data base manage

The combination would an pear to be one of those manrages for which everyone has been waiting. The relational data base offers flexibility in data retrieval and reporting, while the fourth-generation language of users the chance to one ry the data base and draft re ports without getting bogged down in a lot of syntax.

Barbara E. Pembamoto manager of the defense center's information center, does not say Nomad2 (D & B Computing Services' 4GL) used with IBM's SQL/DS represents an in formation nirvana, though she and the information made auxilable "paid for Nomad2 with one

Pembamoto addressed a reent Shaku Atre conference in Washington, D.C., on the use of fourth-generation languages and IBM's relational data base products. She claimed the sys tem enabled end users to use Nomad2 without training. She was reject and to describe the scope of the project or type of reporting executed through No mad2 but said end users found it a powerful reporting tool.

"Once end users got used to Query Management Facility (OMF), we had to look for something more powerful," she

Endusers participated in this evaluation, which Pembe moto said helped ensure the success of the fourth-generation anguage once it was installed If they don't like the product, they will find ways not to use she observed.

From an end-user point of view, a fourth-generation language is a better way of accessmg a relational data base man-Continued on page 28

## Unix may fill McDonald's order

BY JEAN'S BOZMAN OAK BROOK, III. - McDon

ald's Corp. as an IBM mainframe shop, but four years ago, in an at-

tempt to help foreign franchises report their revenues. McDon aid's turned to Unix A prototype system, the in

national Burenery System (IBS), was used in Europe and Asia. It proved so successful that McDonald's is refining it for possible installation in U.S. opera-

McDonald's does not comment on many aspects of the computer system, but the fastfood grant is believed to be one of a few examples of an IBM mancompany considering Unix for its geographically dis-

### McDonald's operations





### The company is believed to be looking for 32-bit supermin what will be AT&T's Unix System V applications. The standalone systems would allow end

users to practice standard accounting functions, while enabling franchisees to report their receipts to headquarters here industry observers say The move to Unix in the U.S.

is being characterized by John Osyath, director of information processing, as a pilot project We were one of the first mpanies to try to do a major corporate accounting system in " says Ted Nagengast senior systems developer at Mc-Donald's corporate headquar ters McDonald's needed to con-

port a samets of international franchise operations with a sin be maintained on a variety of hardware systems plus provide a good development environment, he explains

The McDonald's L'n's appli cations would address needs of an independent franchi see, such as office automation payroll and accounting applica-Continued on page 27

Inside

Ciscom offers upgraded version of Ultra DRMS, Page

 Assesse snaps communica-tions utility for IBM VM enviment. Page 27 · Autodesk ports its Auto cad design package to Vaxsta tions. Page 32.

## VAX disaster recovery plan criticized

### Firm blames slowdown on unexpected customer demand, growth gency maintenance program. ready secured his IBM man-

BY DONNA RAIMONDI

In May 1985, Digital Equipment blitzed the press news of an ambitious desaster re covery plan for VAXs, but the part of DEC's Recovery Services plan that exists today can be difficult for MIS managers to find

The plan promised to provide seven hot sites around the coun try, complete with VAXs, communications lines and administration space, all to be completed by the end of the summer of 1985. It also included an emer-

shell sites ready for the customer's usable equipment and off site disk and tape storage vaults with pickup service However, when customers

today try to get information about parts of the plan from DEC representatives especially about the hot sites, they sometimes meet with puzzled looks

and little belo "If they are trying in sell this plan, they are going about it in a very strange way," one prospective user in Texas says The MIS manager had al-

frame metallation with a continsency plan and wanted to do the same for his DEC minicomput-

rs. Calls to local and regional DEC offices got him pror information but little else. The program has not attained its goals. DEC now offers two hot sites, one in Parsippany

N.L. which DEC calls the New York site, and one in Schaumburg, Ill., known as the Chicago When we first entered the business a couple of years ago,

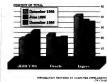
we expected it was at the time program spokesman John Evans-The disaster recovery plan is

not well publicated because it is not a priority at DEC, another anologaman says. 'We haven t gotten full support of our business managers for this because they see disaster recovers for minicomputers as an emerging area at this point," he cou

The lack of contingency facili ties has caused some DEC users ower planning. The U.S. Phys al Service Federal Credit Union for example, suffered a four alarm fire in its Washington Continued on page 31

### Data View Market share of relational DBMS

### on DEC's VAX The race has begun; DEC's RDB is gaining share at the expense of both Oracle and Ingres



## Gartner Group sets distributed standards

BY CHARLES BABCOCK At a time when vendors are making competing claims for distrib

uted data base capabilities, the Gartner Group, Inc. has adopted seven rules with which to evaluare distributed products The rules, or standards of transparency to meers, were for mulated by Michael Braude vice-president of the Gartner Group's Software Research Center The aim of the standards is to require a distributed data

have management system to provide location transparency or full DBMS functions, regard less of the location of the user or Although Oracle Corp. Reta

tional Technology Inc. Tandem all offer perces of distributed data base technology, no yendor Braude said A full distributed system would have to be based on a global data dictionary and a sound underlying process of detributed query optimization." addition the dictionary carebile to must be distributed across the different nodes of the network That is beyond the current state of the art, which is charac terized by some transparencebased on a global, but not a dis-Continued on page 31

said

## Cincom updates Ultra's capabilities

BY NINAMARY BUBA MAGINNES

CINCINNATI - The new release of Cincom Systems, Inc.'s Ultra Interactive Data Base System, a relational data base man agement system for Digital Equipment Corp. VAX computdistributed capabilities, the vendor claimed.

Eltra Varion 1.5 also includes data base file maintenance utilities, increased secunty within the Spectra relational query language - Cincom's proprietary language used in-

stead of SQL - and additional referential integrity within 121tra's relational data manager Ultra has a small installed base in what has been a fastgrowing market. Cincom reported 350 licenses issued, com-

DEC distributed environment. Users at a single remote site can access and update files controlled by a DBMS in another location. The data base manager on the local machine will search pared with more than 3,000 for the data base locally. Ultra product manager Doug Baer unity bonneed for the VAY by

both Oracle Corp. and Relational Technology, Inc. Cincom said the new release can act as a network server in a

data base manager will then seek the data base on the network. logging on to the remote node without user intervention, Baer The data base files could re-

sade on any node but generally will be located at a central Server ute to maintain data hase integ rity. If there is a failure during a remote session a recovery mechanism will roll back to the last commit point, precluding the need to start a remote session from the beginning, Baer noted.

said. If the local search fails, the

The data base software also includes a set of data base file maintenance utilities. The utilities give data base administra tors the ability to unload and re load data as much as 79% faster than before, the vendor said

"Instally, the code was writ ten in Cobol. The implementa tion was not hult for high speed It was built for robust, make sure-it-doesn't-break Baer said. The updated file main tenance utility, written in C, ap pears to the VMS operating sys tem as a DEC Duntal Command Language (DCL) program.

Previously, the utilities could be accessed only through a menu. Now, a user can write a DCL program, for example, that performs a structural maintenance operation, Baer said. The mechanism simplifies the scheduling of certain jobs to run over might when the system is offloaded, the product manager

Greater security Ultra Version 1,5 reportedly

features improved security withm the Spectra relational query language. Cincom plans to sun port both ANSI and IBM SQL standards, said Ronald R. Hank, senior manager of Cincom cor porate relations. Hank did not specify when support would become svalskie

With Spectra's new security features, a data base administrator or system administrator can create and modify user profiles and set limitations on which files and applications a user can ac-

according to the vendor. Ultra Version 1.5 includes en honographs to Litra's Relation al Data Manager, providing additional referential integrity checking for Ultra Physical Data Manager files and DEC RMS files. Data base integrity takes place within Ultra, not within individual applications, the vendor

Ultra Version 1.5 comes with Mantis Version 1.1, the latest release of Cincom's fourth-gen eration application development system, the vendor reported

Ultra operates on all DEC VAX machines under DEC's VMS operating system. Prices start at \$20,000 and increase to \$99,000, depending on the computing environment. Quantity and Vaxcluster discounts are available, the vendor said



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### McDonald's

Ever since the early 1980s, McDonald's had been looking for a way to write a financial system just once — and a way to allow users to upgrade their hardware as their business grew.

as their business grew.
"We knew our markets would grow," Nagengast says, "and we needed to give our overseas operations turnkey solutions that would grow along with the busi-

ness."
McDonald's regional operations in Europe and Asia turned to a number of 1BM mid-range System/34s and 38s to get the financial jobs done. But applications written for those systems could not be used with other

hardware.

"Our business is selling harnburgers," Nagengast says, "Evcrything we do is geared toward helping our store managers sell hamburgers. So we didn't want to create any burden for MIS people in our local offices shroad."

Errst inortalled in March 1984.

the IBS is now used in roughly

half of the 2,140 McDonial's stores oversias. These stores stores oversias. These stores contribute about 39 tableon in sales animals? He 7,300 U.S. Osvath says the aim of the IBS automation program was to provide some measure of office automation, personnel tracking and sales records to small DP or and sales records to small DP or

ganizations overseas.

"The way we run our offices is fairly standard," Osvath says.

is fairly standard," Osvath says, "and in a small office, the emphaiss is on communications." For this reason, McDonald's uses the CCTT X. 25 protocol along with dial-up lines to link the remote Unix systems, as well as the remote Systems/4s and 38s, to the cornocate mainframe.

When IBS was in the design phase. McDonald's programmers were faced with a set of critical decisions. They had already chosen to build a system on top of System 3, Version 7 of AT&T's Uni. But they also saw the need to add features that would provide user-friendliness and security. Without them, end users much not have been com-

fortable converting their manual records into electronic ones. A key concern for McDenald's was that end users not be able to modify the key business application. "We try to insulate the end user from anything our side the application itself," Osside the application itself," Osside the application itself,"

vath says.

Osvath maintains that Mc-Donald's has stayed away from on-line real-time updates of its operations around the world, instead, it consolidates its financial reports monthly, as sales figures are reported. The centralized data base is maintained on IBM 3090 and Analhi 5890 main-maintained are reported.

frames in Oak Brook
"We've laid down a foundation that gives us — and our independent franchises — the maximum flexibity." Nager-

One important consideration in moving to the Unix systems. Nagengast says, is that it was difficult for McDenal4's to count on providing much hand-holding for end users stationed thousands of miles away. Furthermore, Burthermore, likely has any one vendor, including IBM, could support all of McDenal4's operations.

"We had to be able to grow without constantly reinventing our software," Nagengast says. "We like to run lean, and that means not having to buy any more equipment than we need

## Adesse ships VM utility

DANBURY, Conn. — The Adesse Corp. said last week that it will begin shapping a communications utility for the IBM VM environment this week Aefast/VMCF was designed

to improve data transfer performance for those VM mstallitions using IBM's VM Communications Facility (VMCF). VMCF allows users to transfer data from one virtual machine to another The Agrasi/VMCF is send to alleviste problems that can occur utility reportedly decreases response time and decreases the amount of CPU time that is needed for data transfer. Aefast (VMCF increases the

size of a block of data that can be seen at one time from 2K bytesto 4K bytes, according to Ron Sella, Adesse's marketing manager. The software can be leased for \$160 per month or purchased for \$3,800 with a 12% annual materiance for Adesse.



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### 4GL FROM PAGE 25

agement system than SQI statements or even the end-user part of QMF, Query By Example (QBE), QBE "does everyhing IBM says it does and nothing more," said Timothy D. Fuller, support director for Nomad2 and SQL/DS in Westing

house's information center Nomad2 offers a screendriven interface that allows IE/THEN undates and remort formatting that SQL and QBE cannot provide. Fuller said Nomad2 and other fourth

generation languages, such as Focus from Information Build ers. Inc. and the Ramis Information System from On-Line Software International, Inc. translate nonprocedural que nes into SQL statements, re-

turning the results to the user Serving as an interface to a relational data base helps the fourth-generation language

At Blue Cross/Blue Shield of New Jersey, Chief Information Officer Edward D. Wilhams said Rames is used to allow actuaries to obtain information they need or calculating insurance risks. Ramis translates ad hoc queries

into SQL queries run against a new IBM DB2 customer informatton data base. The data base allows actuaries to use informa tion that was previously stored in six separate IMS data bases, Wilhams said

Little experience Each of these users has little experience with DB2 and even

ess using a fourth-generation language in conjunction with DB2. One result was that none of them were sure what would composing their own quenes. which might or might not tap existing indexes to DB2.

DB2 analyzes each query and decides whether to go to indexes, which will steer it directly to the rows and columns ought or scan the whole data

base The Ramas interface doesn't pass parsed query se quences to SQL, so it doesn't use the indexes we thought it would. You request particular columns, but DB2 will do its own sort." Williams said.

Gary Muskowstz, assistant vice-president of Bankers Trust Co. in New York vs a Forus user. He said vendors should build timers into their languages so users can tell how

many CPU resources were being tied up satisfying a query. Greg Wilmore of Deere &

Co., the Moline, Ill., farm equip ment manufacturer, predicted that wider use of relational technology with fourth-generation languages will create an exploson in demand for host resources. "These users don't realize the underlying data base may contain 150 million to 200 million records. They don't realize what SQL statements are being generated or the process ing they require

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## VAX plan

D.C., headquarters in October 1984. Despite the fact that it took the unprotected credit union five months to resume nor mal operations, it still has not subscribed to a disaster recovery plan. Part of the reason is that there is no DEC hot sate in the

Washington, D.C., area, according to Ann Tran, data processing тапарет 'It would be very bad for us to use a bot site in New York be-

cause we need to do updates ev-Tran says. access to our systems [a VAX-11/750 and PDP-11] right away - we can't want for it Tran and her management have decided to subscribe to

DEC's services in the next conple of months anyway, because they feel they are playing with fire by not making any contingency provisions, she save

Volue underestimated Part of the reason disaster recovery schemes like DEC's have not grown faster is that mini computer managers do not understand the value of their minis

the overall computing scheme, says Norman Harris, president of HSH, Inc., a contingency planning firm in Dublin.

Ohio They think that DEC can just set them up with another machine, but it's not that easy." Harns says. "They forget about telecommunication requirements; they forget about interfacing to the mainframe; they

forget about delivery dates and places to put the equipment,

DEC has no plans at present to add another hot site, a move it says will happen when there is enough customer demand.

Meanwhile, Evans maintain that contingency planning awareness is increasing as a result of pressure from companies

XEROX

### Standards FROM PAGE 25

tributed, dictionary." Braude The rules of transparency are 1. Retrieval transparen

A user can retrieve data from any sate, regardless of where the transaction orimnates, and receive results that are the same as any other sate

2. Update transparency. A user can update data at any site, regardless of where the update originates, with the same effect as an undate from any oth-

or site 3. Schema transparency Any user can issue data definition language schema changes from any sate and have those changes visible throughout the

4. Performance tran ency. A command assued at one site performs in the same manner as the same command from any other site. For performance to be comparable, a distributed system must have a distributed query optimizer that can view the entire network and construct an access plan for a dis-tributed command. Braude said.

5. Transaction transparency. A transaction can undate multiple sites un a two-phase commit sequence. Before an update takes effect, all target sites are prepared, with a follow-up and executing the update. The two-phase commit is "a basic building block of distributed data base," Braude said, and is needed to maintain data integrity by assuring that updates occur within "a narrow window of vul-

6. Copy transparency. This transparency is related to a military requirement that the loss of one site on a detributed network should not cost the system any data. By being able to support redundant copies of data base objects, the system maintains high availability of data despite the loss of some nodes. None of the existing products support copy transparency Brande said. He expects it to an 7. Tool transparency. The

last standard is a more am rule than its six predecessors. It requires that all tools provided by the vendor for its distributed ments should be applica ble to all sites.

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### N E Tektronix, Inc. has released Version 2

terminals and workstations

ware, for use in presentation visuals. The

outside files can be combined with Tekni-

### Systems saftware

Structural Dynamics Research Corp. has enhanced its I-Deas Geo draw two-dimensional drafting module for its I-Deas software system.

New features include an acon-based user interface, expansion of dimensioning types including ordinate dual- and angledlinear dimensions; associative dimensionme, which provides for automatic dimen-

sion updating: macro programming language; line weights; intelligent fonts: and multiple sheet drawings. I-Deas Geodraw is available on Digital Equipment Corp. VAX and Microvax sys tems as well as Apollo Computer, Inc. and

Sun Microsystems, Inc. workstations The drafting module is priced from Structural Dynamics Research, 2000

Eastman Drove Millard Obio 45150 VM/CMS Unlimited, Inc. has announced Fast Checkpoint, which is said

to speed the recovery of VM spool files in the event of a system crash. Fast Checkpoint is said to read an en-

ture cylinder of spool files from disk in one operation. It also reports each spool file Fast Checkpoint supports both check-

norm and force starts. A password protect tion scheme is used to ensure that when files are discarded during a force start, it

Fact Checkpoint is available VM/SP Release 3 and 4, It costs \$4,000 per CPU plus 12% per year for maintenance. It may be lessed for \$180 per

VM/CMS Unlimited, 161 Grante Ave., Boston, Mass. 02124.

Goal Systems International, Inc. has appropried Access/VM, a multiuser CMS file system

Access/VM is said to allow multiple, multaneous read/write access to CMS mindisks. It provides extended mindisk security that externally controls read only and read/write access to the CMS mindisks from the VM directory. The system also allows for in-storage file directory validation, eliminating the need to constantly reaccess actively used mini

Access/VM is priced at \$6,720 for a permanent license or \$168 per month under a three-year renewable license

Goal Systems International, 5455 N High St., Columbus, Ohio 43214

### Applications packages

Version 9 of its Plot 10 Teknicad computer-aided drafting package for various hosts, terminals and graphics workstations

Version 9 is said to feature expanded macro programmability, a project views function to simplify generation of isometric views, user interface enhancements and a feature called symbol attributes. Version 9 also supports electrostatic printers and plotters.

Teknicad Version 9 is priced from Annual update agreements start at \$500

Tektronix, P.O. Box 15273, Portland, Ore. 97215

P P O D u c

Tektronix, P.O. Box 15273, Portland. of its Plot 10 Teknicap presentation

graphics package for use on Digital Equip ment Corp. and Tektronix mainframes, ware package to the Duntal Equipment Vaxstation 2000 and Vaxstation Version 2 of Teknicap is said to accept outside graphics files from other sources, GPX workstations Drawings generated by Autocad Versuch as design, analysis and drafting a on 2.5 or later, under IBM's PC-DOS or

ble with those generated by Autocad uncap-produced graphics, diagrams and text der VMS. According to the vendor, in an sides, and the completed images can be environment incorporating personal comreduced on media such as paper, overbead transparencies and film puters and multitasking VAX worksta-Another new feature is the ability to tions, drawings can be interchanged be-

Teknicap Version 2 is priced from

Microsoft Corp,'s MS-DOS, are comp

sulito, Calif. 94965. Autodesk, Inc. has ported its Autocad Languages computer-sided design and drafting soft-

## priced at \$2,850

National Information Systems, Inc. has enhanced its Accent R fourth-sener ation language for the Digital Equipment Corp. VAX computer.

Enhancements screens, pop-up menus, fill-in data entry forms and a package for the development

Autocad Version 2.6 under VMS is

Autodesk, 2320 Marinship Way, Sau

of screen-oriented applications. Accent R costs from \$4,000 to \$99,500 National Information Systems, 20370 Town Center Lane, Cupertino, Cald. 95014

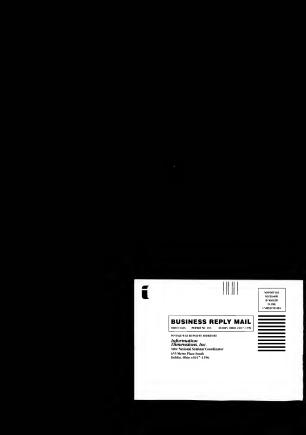




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#### Utilities

Online/Database Software, Inc. has amounced IDMS-DC Cobol Support for The Application Builder (TAB).

for The Application Builder (TAB). The support is said to expand the compatibility of TAB with Cullinet Software. Inc.'s IDMS/R, ADS/Online, ADS/A and IDMS Batch Cobol functionality. It is said to allow users to build on-line Cobol applications using a screen paumer on the IBM Personal Computer XT or AT and run them on the PC or upload them to the

mainframe.

TAB is priced from \$5,000. IDMS-DC
Cobol Support costs an additional \$1,500.
Online/Database Software, One Blue
Hill Plaza, Pearl River, N.Y. 10965.

Axios Producta, Inc. has announced Release 2.3 of its SPI-Tab package for DOS, MVS and XA with CICS and IMS environments. SPI-Tab is said to provide on-line ac-

cess to application tables for updating and maintenance. Enhancements to Release 2.3 of SPI-

Enhancements to Release 2.3 of SPI-Tab include the On-line Assistance option that enables end users to obtain answers to both general product use questions as well as specific questions about SPI-Tab tables.

A screen painting option is said to allow users to design and edit screen layouts. SPI-Tab is priced from \$10,500 to \$22,000.

Axios Products, 1455 Veterans Highway, Hauppauge, N.Y. 11788.

## Development tools Inference Corp. has ported its Auto-

mated Reasoning Tool (ART) to Digital Equipment Corp. VAX/YMS yetsens. ART/YMS was designed to develop business-critical expert systems applications. The software is written in the C programming language. Capabilities include memory management, a patternmatching structure that joins patterns.

matching structure that joins patterns from the left and right, integrated objectoriented and rule-based programmen, graphics and programmer interfaces. ART/VMS will be priced at \$29,500 through luly of this year.

Inference, 5300 W. Century Blvd., Los Angeles, Calif. 90045.

Ctyde Digital Systems has released Procode V2.0, an enhanced version of its code generator for Digital Equipment

int cools generator for logist acquirment in cools generator for logist acquirment cools on the cool of the cool o

The Procode system is priced from \$55,000 to \$85,000. Clyde Digital Systems, P O Box 4500, Provo, Utah 84603.

Westmoreland Software International, Inc. his released Version 7.1 of its Add System for the IBM System/34

and 36

The Add System is said to generate RPG source code and documentation for reports, on-line inquiries, file mainte-

reports of the impacts of the manner programs, batch programs and bar graphs
Features of Version 7.1 include a report-writer language developed for non-programmers, the ability to preserve modification to RPG source code, full as-

cess to screen attributes for fields and the ability to enter compile-time arrays. In addition, Version 7.1 of the Add System has the ability to copy programs from one CPU to another, the ability to handle

alternative index files with incontiguous keys and three enhanced manuals Version 7.1 of the Add System is priced at \$3,850.

Westmoreland Software International, Suite 195, 853 E. Semoran Blvd., Casselberry, Fia. 32707

Promod, Inc. has unbundled its integrated computer-aided software engineering (CASE) environments. including Promod/SA. Promod/RT. Promod/MD, Promod Code Frame Generators and Promod/SC.

Promod/SA is a Yourdon-DeMarcobased structured analysis module. Promod/RT is a structured analysis module.

modyR1 is a structured analysis module with real-time extensions. Promod/MD is a modular design and pseudocode language module. Promod/SC is a structure chart utility.

The modules are said to support the complete CASE life cycle on Digital Equipment Corp. VAX systems, IBM Personal Computers. Hewlett-Packard Co. Vectra computers and AT&T 6300 series models.

Pricing for the Promisd systems starts at \$8,000. Promod, 23685 Birtcher Drive, El Toro, Cald. 92630.



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same easy-to-use language and syntax in each. Plus, you can use the same software on your personal computer.

#### \* Computer Intelligence, January 1986.

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u 50

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## MICROCOMPUTING



#### Moving 4Word

Back when Lotus Development Corp. introduced Symphony which integrates spreadsheet word processing, data base. graphics and communications many thought the 1-2-3 program was on its way out. Of ourse, nothing could have been further from the truth. Lotus's 1-2-3 continues to be the spreadsheet program of choice for a

With roughly three-quarters of a million copies of 1-2-3 shipped in 1986, its sales greatly exceed those of Symphony. It would be easy to conclude that the vast majority of users just aren't all that interested in inte grated products like Symphony Nevertheless, there is considerable evidence that users really are interested in the

broad range of functions the in tegrated packages provide. her rust don't want to give up the program they are already accustomed to using Nowhere is this more exdent than among users of 1-2-3.

For thousands of users, 1-2-3 is their primary way of using IBM and compatible personal computers. Predominately working BY MARY CHAVES

The recent lawsuit by SAPC Inc. - the firm that launched Visteale, the first microcomputer spreadsheet - claiming Lotus Development Corp.'s 1-2-3 consed the "look and feel" of Visscalo prompted Computerworld to do

a side-by-side comparison of the two products Although SAPC claims that Lotus copied the version of Visicalc that runs on Apple Computer, Inc.'s Apple II, the Combuterworld companison was done

between IBM versions of each product. Upon careful examinaon, major similarities and dil ferences were found. At first glance, the spreadsheets in Visicalc and 1-2-3 are similar. There is a three-line statoo area at the top of the screen

in both applications. This area includes an entry line, a prompt line and an edit line. In addition. Lotus s 1-2-3 uses an echo effect similar to Visicak's in the first line, where the current address

of the cursor in the spreadsheer is displayed on the screen. The only cosmetic difference is that Visicale highlights the first two bites of its status area while 1-2-

Below the status area is the industry-standard which shows a portion of the electronic work sheet. In bot1 peograms, columns are designed. ed by letters; the rows, by num bers. In addition to these comparable characteristics. 1-2-3 uses the same default setting for the size of the work sheet cell -Concerning terminology

calls an "entry position. What 1-2-3 refers to as an "address Visicale calls a "enordinate There are, however, no visible differences on-screen Although the Lotus work sheet appears to be similar to

status area. In both programthe first line shows the current cell address (where the cursor is positioned), such as the "A1: the contents of that cell

that of the Very alc work there there are some differences in the

address. This line also echaes Included in this echo, in both programs, is a character design nating the contents of the cell to be either a label or a value (Even the novice spreadsheet user recognizes the importance of mak ing this differentiation; calculations can be performed only on values and cannot include cells Continued on page 38

The R-Card 45 is the only

and Tim Mahones

way for Model 30 users to get

way for nooner an users to get more than 20M bytes of internal

vice-president and general man-

ager of Rodine's Peripheral Sys-

takes advantage of the sneed of

the 8-MHz microprocessor

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Mahoney pointed out that by

users get the advantage of

using the hard-disk card for stor-

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the R-Card 45 is \$1,495

### Tool turns PC AT into AI station

BY DAVID BRIGHT

CAMBRIDGE, Mass - Hoping to speed the acceptance of artificial intelligence within corpora tinns. Gold Hill Computers. Inan expert-system building tool that it claims brings the capabilities of dedicated Al workstations the IBM Personal Computer

Gold Hill also announced last week upgrades to its Golden Common LISP language and Golden Common LISP develop-

Because applications created using the Goldworks expertissis teni building tool can be used on existing IBM PC ATs it repre sents a distinct advantage when

compared with higher priced dedicated systems that cost as much as \$100,000. Gold Hill offs cals claimed. Corporations need in develop expert systems that they can

deliver to large numbers of ussaid Jerry Barber van Continued on page 36

 Ford identifies airfine vvs tems faults with micro-based expert system. Page 36. · AVI releases I CD-based projection system. Page 39 Granhic Systems links Space Program to CAD system. Page 40.

#### what 1.2.3 calls a "real " Viscoul-Rodime hard-disk card fits Model 30 Updated R-Card 45 boasts 28 msec seek time, is XT- and AT-compatible

CLEVELAND - Rotine Inc.'s sets of cables that allow denote Peripheral Systems Division has connection to the PC XT. AT rapped a hard-disk card for and Model 30's nower supply connections avoid

sonal System/2 Model 30 that it claimed has an average seek time of 28 moor The product is an enhanced version of the company's R-Card

Besides being compatible with the PS/2 Model 30, the enhanced product as said to work with IBM's Personal Computer

Rodine said it will supply both 514- and 312-in, diskettes with each drive The product comes with two

They are refocusing their ef

forts from purely calling pur-

chasing agents and offering the

motherboard distribution prob lems. The card can be installed into any of the three available slots in the Model 30

Getting ground limitations The product also is available with a full device driver and in staller that allows users to get round IBM's PC-DOS 32Mbyte limit. The R-Card 45 also supports Microsoft Corp.'s MS-DOS 3.3 and can acess its disk

manufacturer of one product can't provide So [users] can go to one place and get their MS-DOS machines which they are still gning to buy a lot of and the Macmook which we hope they'll buy more of: software from Microsoft, and a network, possibly from 3Com or Ungermann-Bass. selves. They can have all that put together and have training and support provided very economic calls and effectively by that deal

gle-company manufacturer can r privide vers well So we have to continue to vide large customers of our

want, but also through those resellers to have the availability or the service and support and system integration that they also

How many of these For tune 1,000 accounts really need outside support? If they have the expertise in-house, all they'll care about is getting products cheaply. First, out of our 75 corporate as

nunts we have at least three right now that would prefer to deal with Businessiand for all Sex and AUS hadauts in land companies have not been everly expanded over the post few Continued on page 37

#### Apple sees dealers spearheading its MIS attack This is the conclusion of a two-

tort interview with Charles Berger, Apple Computer, Inc.'s vice-president of business development. Berger spoke recently with Computerworld Senior Editor Patricia Kerje

Can you exploin your No-tional, or Key, Accounts progrom? That sales force and selling ef-

fort is only directed at 75 accounts. Parallel to that - and expanding Apple's relationship with organizations like Business land. Nynex Corp. and others is the dealer world which has targeted its efforts at the Fortune 1,000 marketplace, as well as, in some cases, small and me-

best price on an MS-DOS ma chine to calling and working on demand-creation for products that they can make a significant profit margin on, and the Macin tosh has been one of those. Our efforts beyond the 75 key ac counts have been carried on by our dealer network and in some cases, by our [value-added resell-

How ore you going to con vince MIS to b uy in volume from dealers? Well, we see a couple of trends

happening, and we're seeing a

icssering of that trend - as you put it - of MIS directors want me to deal directly with the com-Dany

Why do you think that is? Well, it's very clear that IMIS do rectors] want to have direct access to the company. They feel a need, and rightfully so, to have views in the future, to see how technology is going in evolve and to understand the product directing so that they can express their views and have them con idered directly by the company And again, they are seeing orea

resellers [with] access to the

### Ford system spots test faults in record time

Quest to save time and money leads to creation of airline fault-testing system

BY PEGGY WATT

construction set, which can cost thousands of dollars

NEWPORT BEACH, Calif - A micro-In fact, the six-month experiment was computer-based expert system is helping engineers in the seroneutronic division of Ford Aerospace & Communications

Corp. identify faults in airline systems tests — and doing it in half the time it The new Fault Isolation System is par ticularly economical because it was written with the sub-\$100 Turbo Prolog product from Borland International rath

or 40 in an SSI complex

an on SSI complex An SSI complex supports up to 33 processors

software licensing and re-

in on SSI complex

er than with a dedicated expert-system

so successful that developer John Chihorek recently received a \$45,000 grant to turn his specific application into a geexpert system for Ford.

The project started as a quest to save time and energy spent in manual inspec tion and pen-and-paper fault finding, Chi-

I wanted an expert diagnostic system for a nonexpert technician to run." Chi

horek, manager of software engineering for Ford Aerospace, explains.

One-guy development effort orek started building the system in October 1986 and put it to use in April. "It was a fast, one-guy development of-fort," he says. The finished product has 140 rules with about 120 conditions

which keeps memory requirements low

enough to run the system on an IBM Personal Computer XT To operate the system, a user enters readings from forward-looking infrared pods and payload reports, which are tests of airline day-night (infrared) instru ments. The test equipment readings help determine the instruments' proficiency

The Fault Isolation System then flags unaccentable readings and traces the nossible causes, which could include over heating, voltage or timing problems, Chihorek says. Cro.s-checks to determi whether one error led to another are built into the rules and used to trace errors back to their source. The user can do online undates and correct an erroneous diagnosis, immediately changing the rule from which the incorrect conclusion was

Chihorek says he hopes to eventually modify the system to directly receive instrument readings by radio frequency from the equipment being tested. With this in place, the user will not have to enter the data physically, he claims

Supplements human evaluations The Fault Isolation System is also being used to supplement human evaluations. "We use system engineers to validate the rule base and actually do testing." Chihorek says. Only one such system is in use mented at other Ford sites

The system is running on an IBM PC AT, but Turbo Prolog's speed and memory requirements allow the program to run on less powerful systems

Chihorek says he opted for Turbo Prolog because it permitted an inexpensive experiment and because he had been impressed with previous work with Turbo Pascal, "I'm pleased at how fast it went together," he says.

#### Al station CONTINUED FROM PAGE 35

for Gold Hill, "Until now, they could es ther build a serious expert system, which would run on specialized workstations, or build something less effective" for a PC Barber stated that an 8-MHz AT with Goldworks can achieve approximately 20% of the performance of a high-end dedicated Al workstation. He claimed that such a performance level is adequate

Goldworks was demonstrated last Fall under the code name Acorn. Of the 50 beta-test sites so far, half are financially oriented institutions. Barber said At those sites, Goldworks applications perform such tasks as the monitoring of bro-

kers and loan reviewing The package comes with external interfaces to Lotus Development Corp 's 1-2-3. Ashton-Tate's Dbase and the C programming language

Goldworks is said to break the 640K ste memory barrier imposed on most Microsoft Corp. MS-DOS-based applicaons by switching to the Intel Corp 80286 or 80386 chip's protected mode to access extended memory Goldworks lists for \$7,500. Bundled

with Gold Hill's 386 Hummingboard accelerator board, the proce is \$13,300 Through the end of July, the respective for Goldworks and the Goldorks/386 Hummingboard package are \$5,000 and \$10,800. Goldworks requires at least 512K bytes of base memo ry, 5M bytes of extended memory and 7M bytes of space on a hard disk drive.

## Two ways to expand your VM System.

#### Ours. Single System Image ISSII from VM/CMS You can use any processors in Group 10, 20, 30

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SSI dynamically switches writial machines from one

You can use any version of VM/SP or VM/HPC

SSI supports FBA and Count Key/Data devices

SSI doesn't require extended storage support

SSI has been in production since 1980

SSI balances the user load automatically

ssar to another to satisfy user requirement This means a user's terminal and writial machine can be on different CPUs. As a result, duplicate

nance charges can

VM Inter-System Facilities (ISF) from IBM

IBM's ISF cloes not support Group 10 and 20 processors In Group 30, ISF only supports 4381's with 16 megabates or more, and 3083's In Group 40. ISF does not support the 3081 D16 processor

With IBM's ISF, you can't use IUCV and VMCF across

Theirs.

BACK PSE or lumined to two CPI to IBM's ISF affers no switching capability

IRAC's ISE requires that you use HPO 4.2

IBM's ISF doesn I do load balanona (BM's ISF inter-system link and spool facilities do not support FBA devices

IDAL PER done

IBM's ISF planned availability isn't until August 1987

SSI allows multiple VM-based CPUs to communicate with each other in order to present a single system image to the users SSI is the only current alternative to CPU upgrades that can keep user resources fragments those users anto multiple CPUs An SSI complex affers the reliability and availability of multiple-pracessar configurations together

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### Moving 4Word

with spreadsheet applications, many users "live inside" 1-2-3 when using a personal computer

Turner Hall Publishing Co.'s 4Word is a fully integrated add-in that gives 1-2-3 users a very canable word processor that will live inside 1-2-3 for only \$99,95. Built with the Lotus Developer Tools, 4Word integrates with 1-2-3 more closely than

Symphony's word processing does with its spreadsheet capabilities 4Word's hot-link capability lets you place data from a 1-2-3 spreadsheet directly into 4Word documents. This is done by selecting ranges in the spread sheet to be included in the document. While the spreadsheet remains the same,

changes to the data in the spreadsheet however, are immediately selected in the

sheet. 4Word prompts you for a data

Although it doesn't have all the bells and whistles of the most powerful dedicated word processing programs. 4Word is a full-function word processor. It not only offers basic word processing functions like word wrap, text justification and for-

matting, but also includes a wide range of more-advanced canabilities 4Word also includes a mail-merge canability that can be used to create form letters, which works via 4Word's hotlink capability. Mail label and salutation data, for example, is kept within a row and column range of the 1-2-3 spread-

base range for the merge data. Because 4Word is fully integrated with 1-2-3, it is able to use the printing capabilities of 1-2-3 directly. It there-

fore supports the same range of printers, osing the same devers as 1.2.3

4Word is installed by a straigh ward procedure that makes use of the Lotus 1-2-3 Add-In Manager. Utilities provided with 4Word are used to modify the 1-2-3 driver set to handle the enhan text options of 4Word and to install the

Lotus 1-2-3 Add-in Marager The latter is then used to install 4 Word. You have the option of letting 4Word start automatically when 1-2-3 is started or invoking it manually when you

The 4Word command menu may b used to restrict 4Word to a range of 1-2-3 cells within a column in the sneeadsheet In this way, you can be sure that 4Word document's are created using a section of

the spreadsheet that will not interfere with normal sureadsheet operations 4Word is typically called up by press

ing a keystroke combination while in the spreadsheet. This puts you into a 4Word text screen. At this point you may enter text. To return to the spreadsheet you simply press Esc or the Alt-F9 combina tion. You are then exactly where you were when you left the spreadsheet All in all, 4 Word provides an excel-

lent, low-cost way for dedicated users of 1-2-3 to obtain powerful word process ing capabilities without ever leaving 1-2 3. It delivers sold value that will be appreciated by many corporate users

Zachmann is vice president of research at Interna tional Data Corp

#### Apple

INUED FROM PAGE 35

years. That's our observat The ability to build a staff to provide that has been difficult for many companies, and many companies have said, "It's maintaining a large staff to go train everybody on word processing or data base or spreadsheet or different communications access technology. But we would really like to be able to pay somebody else to do that for us when we need it and as we need

That's a trend we're seeing happening very much. There are companies with hundreds, in some cases thousands, of microcomputers, who are coming in almost daily - they can't keep up with it. They also see that after you get over this initial wave of training, you don't necessarily want to have a huge staff left.

## What's Apple's strategy for com-peting with IBM? We are certainly not going in and saying 'Take out your IBM.' Our principal focus

is to go into areas where we don't have to compete head on, or bit for bit or byte for byte, against IBM, DEC or anyone else

We're saying 'Here's a machine that will exist with IBM and does some things differently and, we think, better.

#### Publishing is clearly one. We've had sig-

ruficant success in the service industry where billable hours are their principal product, where an hour spent in training equals not only the cost of that hour, but a lost hour of revenue. So low training costs are important for firms like Peat, Marwick, Arthur Young and the audit department of Bank of America. We're looking at expanding into eng-

neering, where graphics, as well as strong productivity applications and the integra tion of those is very, very important. But selectively, so as not to ever be positioned 180 degrees at odds with IBM. We have ad tremendous success with Mc-Donnell Douglas, Hughes, General Dynamics and virtually the entire list of aerospace and defense companies A lot of people are finding that the Mac

works so well in that specialized area that maybe it's a good broad-based personal ess computer.



#### Visicalc, 1-2-3 CONTINUED FROM PAGE 35

Visicale uses a straightforward designator: (I.) for label and (V) for value. So the acho line in Visicale might look like this: "B15(L) lanuary.

Compare this with 1-2-3, which took this label-value designation method and

In 1-2-3, every cell that contains a labelalso contains one of four possible label prefixes (fill in here), which allow users to short be corrects of an individual cell or a group of cells. This cell-abgnment capability is available in Visicale through the command G(lobal) Flormat I

On to the menus. Both Visicale and 1-2-3 invoke their menus by pressing the key After that, however, there are two differences between the programs.

First, in Visicale we see a series of let Vicente's man more looks like this BCDEFGIMPRSTUW- Once the com mand has been invoked, by pressing the appropriate letter, the echo line in the sta tus area displays the command word and necessary prompts.

Lotus, in a very effective attempt to be user-friendly," displays words immediately after the user invokes the "/" key: Worksheet, Range, Copy, Move, File, Print, Graph, Data, Quit But users can asso execute 1-2-3 commands by pressing the appropriate initial.

status area where the menus are displayed. Both programs have menus within menus. In 1-2-3, the user almost always sees two layers of the menus, which apnear on the first and second lines of the

three-line status area But in Visicalc, both menus and subnus are displayed on the second line, so the main menu disappears from sight as the user moves through the inner levels of

the submenus. One other difference is seen in entering information into a cell-Lotus uses the second line as its entry hne, Visicale uses the third line In terms of the commands themselves. differences exist in order of execution as well as in terminology. For instance, the Visicale Replicate command is called a Source (in Visacalc), or to (1-2-3) range. and prompted for a Target (Visicalc), or to (1-2-3) range. In both programs, users are free to type in the range addresses or to "point and highlight" the range with Lotus uses other commands also found

both programs: The user is pr

in Visical: including Delete (row or column). Format (a specific range of cells) Global (which includes Column width, Recalc and Format). Insert (row or column and Window, and consolidates them with n its main-menu command Worksheet. Worksheet controls operations that affect the entire worksheet. The keystroke seassence to insert a row in Visicale as: //(nsert) R(ow), in Lotus, /W(orksheet) I(nsert) R(ow). Command ontions involving an individual cell or a range of cells are similarly grouped within the Range com-

While Visicale includes cell alignment (for both values and labels) as part of its Format and Global Format commands Lotus pioneered the concept of the label prefix. In Lotus, one can not change the alignment of cells with values in them rather, they automatically align to the

Lotus added the Data and Graph com mands, data hase and chart-peneration canabilities, which do not exist in Visicale These functions go beyond the core con-

cent of the electronic survadsheet In fact, within the Lotus 1-2-3 Release 1A manual there is an appendix that pro-vides a chart of 1-2-3 equivalents for Visi-

Command options involving an individual cell or a range of cells are similarly grouped in both programs within the Range command. To format an individual cell in Visicak, the keystroke sequence is /F(ormat) \$; in Lotus, it is /R(ange) F(or-

While both similarities and differences between the product are apparent, it will be up to the courts to decide whether Lotus has illegally copied Visicale.

Chases is a PC training specialist for EDG Lorinia

## Program said to 'challenge intelligence'

BY DOUGLAS BARNEY

A structured programming language available as shareware was announced by developer Dennis Baer of Farmingdale,

The language, called Structured Programming Language, is a general-purpose language that translates to Basic and runs on IBM Personal Computers and

compatibles, Baer said This is for programmers, someone the has worked with Basic or doesn't like

Pascal. This will challenge their intelli-The product is available through PC-SIG, Compusery, Inc. and The Source.

Baer said he requests a donation of \$50 to \$100 if the user finds the software help-

## "Copy" in 1-2-3. It works the same way in The New CPT 9000. Bigger, Faster, and more Productive than Macintosh.



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#### Systems

Anex Technology, Inc. has announced the Multi-PC/3270, an IBM Personal Computer AT-based multiuser mic computer system with concurrent 3270

micro-to-mainframe communications for The product includes a 3274 cluster roller for eight 3278/3279 terminals. 3287 printer support, micro-to-main-frame file transfer and IBM PC-DOS ap-

pheatsons software at each terminal The Multi-PC/3270 can be implemented with up to eight terminals on an Anex-supplied PC AT compatible. Terminals consist of IBM-compatible monitors and keyboard. They can be located up to 500 ft from the system.

An eight-user system ready for con ection to an existing AT costs \$12.245

With the Anex AT computer, it costs Anex Technology, 151 N. Route 9W. Congers, N.Y. 10920

#### Software applications packages

AVL, Inc. has announced the Shoview PC Projection System, an LCD-based

gresentation system

ride and control.

Shoview is said to allow users to proect personal computer monitor screen output in a preprogrammed or real-time overhead presentation. It allows users to include any files created in Microsoft Corp. MS-DOS or IBM PC-DOS, including word processing, spreadsheets and graphics, in overhead presentations. The software allows a preselected show to run mattended while allowing speaker over-

Features include 16 dissolve rates, 40 or 80-col, text and a file camera that grabs all or part of a file for use in the presenta-

iow is proceed at \$1,250 AVL, 56 Park Road, Tinton Falls, N.J.

#### Saftware utilities

Price Engineering Co. has announced a Fluid Power Symbols Library for us-ers of computer-aided design and drafting

The Symbols Library is said to allow creation of hydraulic and pneumatic circosts. It features more than 600 schematac symbols ranging from basic directional valves to complex hydrostatic transmis-

The library is priced at \$240 including a reference manual with 514-in. diskett for use with Autodesk, Inc.'s Autocad and Cadkey Price Engineering, 22577 Johnson Drive, Waukesha, Wis. 53186.

Lotus Development Corp. has re-

duced the price of its 1-2-3 Report Writ-

1-2-3 Report Writer is a com product for Lotus 1-2-3 and Symphony. It is said to allow users to generate custom used reports and forms from data base files. It also simplifies and speeds-up the process of producing mailing labels from 1-2-3 Report Writer is now priced at

\$95. It is no longer copy-protected.

c

#### Lotus, Cambridge Pkwy , Cambridge Mass. 02142

Software

#### ancements

Index Technology Corp. has nounced Version 1.7 of Excelera software for systems analysis and design Excelerator includes a graphics facility for developing and revising system dia-erams and charts, an integrated dictionary and a paint facility for prototyping screens and reports prior to coding Version 1.7 offers the ability to funcware to customize Excelerator's dictio nary and its user interface. Additional enhancements include improved user in

terface features, improved support of data model diagrams and Constanting structure charts and additional analysis reporting capabilities. Excelerator runs on IBM Person Computer XTs and ATs. It costs \$8,400. Customizer costs \$12.500

Index Technology, 101 Main St., Cam hodge Mass 02142 ICS Computer Products. Inc. has en-hanced its Labtech Notebook data acsition and control program for IBM Personal Computers to support the ICSS41 series analog and digital I/O cards

The ICS541 series is said to provide a means for the user to configure a mix of analog and digital I/O for an application only one or two slots in a PC PC using only one or two sk XT. PC AT or compatible Labtech Notebook allows multichan

nel data acquisition and display. It sup-ports all the ICSS41 modules. It costs

ICS Computer Products, Suite 208 5466 Complex St., San Diego, Calif

Graphic Systems, Inc. has an that the Space Program, its personal computer-based design and space-planrong software, now links to Versacad Corp.'s Versacad computer-aided draft Continued on page 40



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COMPLITERWORLD

Continued from base 39 ing and design system

The Space Program performs stacking and blocking allocations and generates text and graphs cost estimates space-accounting summanes. The bidirectional interface with Versacad allows users to transfer Versacad drawing files to the State Program and Space Program-generated blocking allocations back rsacad.

The Space Program costs \$444.95. Graphic Systems, 180 Franklin St., Cambridge Mass 02139

ufacturing and Consulting Services. Inc. has announced an enhanced graphics adapter (EGA) version of its Anvil-1000MD computer-aided design and drafting software The EGA version is a two-dimensional

ight-color system that runs on the IBM Personal Computer AT and compatibles It features automatic calculation of dimensions, drawing manipulation and merging and advanced drawing-annotation features The EGA version of Apvil-1000MD

rs \$2 495 Manufacturing and Consulting Se nces, 9500 Toledo Way, Irvine, Calif.

#### 92718 Trainina

Anderson Soft-Teach has appropried two video-based training courses for IBM's Displaywriter 4 word processor

Displaywrite 4: Mastering Word Processing and Displaywrite 4: Ad-vanced Technique.

Each course includes a personal training guide and practice disk and videotape. Each is available in VHS, beta and %-in formats. Users are taken step-by-step through specific skills and are provided

with bands-on exercises. Topics covered in the first course include creating and revising documents. format functions, printing, the spelling dictionary and outlines. The advanced course includes form letters, headers and footers and combining documents

The courses cost \$275 each or \$495 as Anderson Soft-Teach, 2680 N. First St., San Jose, Calif. 95134.

attendee travel and hotel

arrangements. Because it's

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Wed the complete attended

Resente In Inhabitationing Y

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success—it's time to get on it

COMDEX/Spring '87 REFLECTS SUCCESS!

#### Board-level devices

Ariel Corp. has appounced the DSP-16, a signal acquisition, synthesis and processing system contained on a single IBM Personal Computer plug-in card.

The DSP-16 is said to combine two channels of I/O conversion, a 256K-byte data buffer and Texas Instruments, Inc. TMS32020 digital-signal processing mi

The DSP-16 comes with the PC Sampler software package. The software package consists of a program develop-ment system and five software applica-

The DSP-16 costs \$2 496 Anel, Suite 404, 110 Green St., New York, N.Y. 10012

Profit Systems, Inc. has announced the Elite 16 multifunction board, The multifunction board features 16M-byte random-access memory expansion; Expanded Memory Specificat support; support for 12- and 10-MHz IBM Personal Computer AT compatibles; true zero-wait state support in 6- and 8 MHz zero-wait state systems: two RS

232 serval ports and one parallel port. The board comes with software said to etermine the amount of conventiona and extended memory in the system, determine the amount of memory installed on the board and determine the type of memory module in each bank of the

Flite 16 is neced at \$695. Profit Systems, 30150 Telegraph Road, Bermingham, Mich. 48010.

Tecmar, Inc. has introduced the Captain 286 expansion board for the IBM Personal Computer XT 286, PC AT and compatibles.

The board combines multifunction features with extended memory support and expanded memory under the Lotus/Intel/ Microsoft Expanded Memory Specifica tion Standard features include an IBMcompatible parallel printer port and an RS-232 serial port. Memory expansion up to 4M bytes is supported using 256Kbyte single in-line memory modules. Using 1M-byte in-line memory modules, the board supports up to 15M bytes of extended memory The Captam 286 costs from \$845 for

the 512K-byte version Terman 6225 Cochran Road Solon Oho 44139.

#### Auxiliary equipment

Lutzky-Baird Associates has announced the LBA voice annotation system for use with its Ultra office-network productivity system

The voice annotation system is said to provide the ability to add verbal comments to Apple Computer, Inc. Macin tosh computer documents. The user's sice is picked up by a microphone and the signals are digitized and stored in the computer with the document for later secornoration. Users can comment on

spreadsheets, graphs, drawings, data hase material and word processing. The LBA voice annotation system is priced at \$150 for the Macintosh. An IBM Personal Computer version of the system

expected in lune Lutzky-Baird Associates, No. 2011. 23801 Calabasas Road Calabasas Calif



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## NETWORKING



IBM buffers

net lumps

princess and the pea? How she

came to stay one night in a cas-

bed piled high with about 20

with a sore backside because

there was this tiny pea at the

ttom of the bed?

tle, and they provided her with a

mattresses, but she still woke up

That story has some bearing

on the communications strategy

the past few months - particu-

Application Architecture (SAA)

IBM, the "perfect" host.

princess, any more pain from close contact with all of those in

compatible, system-specific

ly a near more like having a

would like to spare the user, or

networking protocols (not exact

boulder in one's bed). The ven

dor proposes to install succes-

sive layers of networking soft-

ware to act as buffers between

Ever since establishment

wide networking (a term cur-rently used by IBM spokesmen)

became a major user priority and

vendor selling point, all sorts of

people have been taking pot

the users and the lumpy realities of low-level networking

that IBM has unfolded during

larly with its recent Systems

## Retailer shopping for ISDN

BY DONNA RAIMONDI

ANAHEIM. Calif. - Integrated Digital Network (ISDN), the elusive service of the future that will allow MIS to blend its data, voice and video needs on one network, is a concept that a retail corporation here is taking very seriously.

Carter Hawley Hale Stores Inc. 15a centralized firm, devoted to one vendor in each area of im-- IBM for computers and AT&T for networking -and committed to integrating voice and data for its 18,500 terminal users, said James Rotheoberger, manager of communica tions obmaing.

The company recently broke into two units: the Neiman Marcus Group, which includes Nei man Marcus, Bergdorf Good man, Inc. and Contempo Casuals stores; and Carter Hawley Hale, which includes Broadway, Emporium Capwell Co., We stock's and Thallimers stores. Weinbe universal gateways to everything: it will replace worse data telex and other systems." Roth-

ISDN is a critical issue for Carter Hawley. It is something the company has been working on for some time and already has implemented as far as possible he firm is increasingly using T1 lines and carrier services that promise to provide integration of voice, data and video as well as help migration to ISDN. It is also involved in ISDN product devel-opments with AT&T and IBM strict nondisclosure

Carter Hawley said it eventually will use video for training and advertising, and the video will be integrated with voice and data management and security features on the T1 lines the company is installing initially in Southern Cabfornia Carter Hawley

has already started to drop its

agreements.

nectivity to AT&T's central of fices. By doing so, the firm will be able to take advantage of vartual networks, like AT&T Software Defined Network, a precursor for ISDN, Rothen rger explained

We will book into AT&1 eventually. As a national compo ny we have to hook into ATAT so we will have the same internationwide. Rothen berger said. Each divested Bell operating company has its own idea of ISDN, but each is proprietary and will not interface cross-country be added

On the application level, Carter Hawley is developing one payroll and accounting system. The firm also is integrating voice and data where possible and developing centralized network management and security Upgrading to ISDN will create problems in keeping up with the speed of technological changes. Rothenberger said

Continued on page 47

#### Firms unite to conquer

and Sequent Computer Sys tems, Inc. have announced an agreement whereby a version of Network Innovation's Multi-plex link between IBM Personal omputers and relational data base management systems will run on Sequent parallel comput ers. Multiplex integrates PC ap plications based on Microsoft Corp.'s MS-DOS into AT&T's Unix relational data base sys tems, such as Oracle Corp.'s Or-Relational Technology arle Inc.'s Ingres, Informix Software Continued on page 46

## Linkware adds VTAM to PC link

BY ELISABETH HORWITT

WALTHAM, Mass. - A VTAM-based frame link recently introduces by Linkware Corp. helps MIS managers improve response time and avoids contention prob lems on the host, the vendor

A new version of the existing Linkware Information Server at lows users to access files on IBM MVS and MVS/XA system through a direct link to VTAM The product includes a VTAM host-based file management pro gram and the Linkware PC Con pection, which communicates with the host program in order to provide für transfer, terminal emulation and data transfer ca

pabilities. interfacing directly with VTAM rather than with telecommunications monitors such as IRM's CICS or TSO the information server reduces the main frame work load and speeds up response time according to Linkware

Shearson Lehman Brothers Inc.'s Commercial Paper unit has been using the older version Continued on bore 42

 DEC sids data base access with Dectafk Voice Respons System and links LANs with Metrowave bridge. Page 45 e Harris unwrape E-mail. way. Page 46.

Warning: Bargains can be hazardous to your network.

#### Private branch exchanges account for more than half the \$16.635 million U.S. businesses spent last year Private branch exchanges 52.5%

Data View

1986 telecommunications equipment budget

Modern equipment 16.6% -Key telephone syst ms 14.2% -

Ti multiplames 4.0% et-ewitching equipment 4.6% ch-and local-area networks 2.5% de palerowene 2.5% --

INFORMATION PROVEIED BY SALOHON BROTTERS, IN

#### shots at IBM for creating so many autonomous and incompatible computer lines. And now that IRM is earnestly trying to Continued on page 47

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## DEC debuts voice response system, LAN link

BY DONNA RAIMONDI

An integrated computer system that en ables users to access data bases via telephone and a tool to link and manage multiole networks were introduced last week by Divital Equipment Corp. The Dectalk Voice Response System

based on the Microvax II, allows users to access data bases via AT&T Touch-Tone telephones. It can be used as a stand-alone sunt or as a front-end system to large contem that can be accessed via a DEC netDecnet software and DEC's Ethernet hardware so that users can access resources of other commuters on the netcal-area Vaxcluster, and while the system cannot reside in a high-end Vaxcluster, it can be bridged to one via networking op-

tions, a spokesman said. The Dectalk stores data in ASCII forat and reads it out over the telephone The \$40,000 basic unit supports two to mucht Dectalk channels and has SM bytes of main memory, a 71M-byte 5%-in. Winchester disk, a cartridge streaming tape drive, eight- and four-line interfaces and a

It can be upgraded to support up to 32 Dectalk lines. The maxim price is an additional \$121 500, but there intermediate upgrades, a DEC spokesman said.

DEC also released its Metrowave bridge, which links multiple geographical ly separated Ethernet local-area networks (LAN) using a 23 GHz microwave hink at the full Ethernet speed of 10M bit.

The Metrowave is similar in function to DEC's LAN Bridge 100, but in a cam pus-like environment it can connect Eth ernet segments residing in separate build

ings up to a distance of 412 miles, or 7,340 meters. The LAN Bridge 100 links adacent Ethernet segments within buildings mode an area of 22,000 meters

The DEC portion of the system costs \$28,000 for both ends of a link-in cabinet configuration packages M/A-Com Inc. DEC, supplies the necessary microwave

radio equipment for additional costs The Metrowave bridge automatically detects and adjusts to network configuration changes - such as a node disconnected and reconnected in another segment of the LAN. By keeping local traffic local and passing over the bridge only those messages addressed to remote users. Metrowave provides more efficient

use of network resources

## Server allows users to share IBM gateway

BY ELISABETH HORWITT

FOSTER CITY, Calif. - Up to eight IBM Personal Computers or compatibles can gain access to a dial-up host connection through Clusternet II, a network server recently introduced by Intelligent Technoiomes International Corp. The vendor also announced the Gateway Exchange Communications System, which converts one or more PCs into a Systems Network Architecture (SNA) gateway on an IBM Nethros local-area network (LAN). The Clusternet II expansion board and

software convert an IBM PC into a nondedicated server emulating an IBM 3274 Cluster Controller, the vendor said. The server can support up to eight PCs accessing an SNA host via a remote dial-up or leased-line link at up to 9.6K bit/sec PCs are attached to the server via an RS 422 serial link over four-wire shielded cable at speeds of up to 19.2K bit/sec The product was designed to be an in

expensive alternative for small corporate ites that cannot justify either a 3724 or a LAN. noted John Dougherty, Intelligent Technologies' president.

#### Converts PCs into controllers Based on the same server hardware as Clusternet II, the Gateway Exchange

nications System converts a PC into an IBM 3274/6 Cluster Controller on a Nethox LAN. Workstation PCs connacted to the LAN can access remote hosts by emulating IBM 3278, 3279 or 3180 terminals, the vendor said Both Clusternet II and Gateway Ex-

hange have built-in diagnostic features that include a line monitor, a session status routine that continuously checks the server for error events and a statistical report generator A Clusternet II configuration that links

two PCs to a remote IBM mainframe is priced at \$1,795. Upgrade kits cost \$349

A Gateway Exchange Communica tions System configuration supporting 16 mainframe sessions across the network is priced at \$1.995. The 64-session configu ration is priced at \$3,495. The product is scheduled to be available in May.



## People and PCs working together: The Tandy/3Com workgroup solution

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mputers and other PC con patibles on 3Com's proven network You'll still be able to work independently, but you'll have the added advantage of working together as a group a workgroup

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#### Firms unite

CONTINUED FROM PAGE 41

Inc 's Informs-SQL and Unity Corp 's

A melding of computer and data private branch exchange power is the goal of a recently formed partnership between Data Technologies, Inc.

Voice Solutions Corp. and Gandalf The two companies intend to jointly develop products that will harness Data Voice Solution's Centaur, a multiuser computer system that is compatible with Microsoft Corp.'s MS-DOS, to Gandalf's Private Automatic Computer Exchange

The idea is "to give terminal users both PC and networking capabilities," the

Procter & Gamble Co. has tapped BBN Communications Corp. to sup-

ply the packet-switching equipment for a major private network installation that the retail giant is planning. The network will connect Procter & Gamble's corporate data centers in Cincinnati with national and international manufacturing

No details were available on the size of the purchase, but it includes packet packet assembler/disassemblers, the Network Operations Cen-

used to link multiple terminals to host ter and Network Access System

IBM has reportedly ensured that upon purchasing one of the new Personal Systemi2s, customers can immediately start using it to communicate bisynchronously

Prior to the PS/2 announcement, IBM allowed Micro-Integration, Inc. to test its Microtam line of bisynchronous con trol PC-to-mainfearms, communications

products on the PS/2, the software ven With the release of the PS/2, Micro-Inegration began selling an upgraded, 31/2-

m. disk version of BIS-3270, which provides bisynchronous communications for IBM's new nucrocomputer line.
An IBM Personal Computer version of

BIS-3270 is currently being sold by IBM under its own label

Codex Corn, has somed the throng of T1 switch vendors that are providing a link between their proprietary products and gital Access and Cross-Connect System (DACS), the gateway to AT&T's networking services such as Accunet, Customer Controlled Reconfiguration

and Megacom Codex's recently introduced DACS Services Access, an optional software en hancement for the 6240 T1 multiplexer. allows 6240 users to interface directly with DACS-based AT&T services via a T1 bisk

National Semiconductor Corp. and Celerity Computing are planning to port their minicomputer systems onto Digital Equipment Corp.'s Decnet through a software package from Technology Concepts, Inc

Both companies recently obtained licenses to resell Technology Concepts Community, a software product that implements Decnet on non-DEC systems. A Sudbury, Mass-based subsidiary of Bell Atlantic Corp., Technology Concepts was founded by Decnet architect Stuart Weeker, Other Community licensees include Unisys Corp., Sun Microsystems, loc and Five



DALLAS - Following in the footstens of Digital Equipment Corp., Hewlett-Pack-ard Co. and Wang Laboratories, Inc., Harris Corp. announced a gateway between its own host-based electronic mail system and IBM's Distributed Office Support Systems (Disease)

Through Disoss gateway software de veloped by Harris's National Accounts Di vision, users on the Harris 9300 network communications system can exchange mail with Disoss-compatible systems in-cluding the IBM System/36, 38 and Dis-playwriter, DEC VAX, HP 3000 and Wang VS, Harris said.

The gateway communicates with Disoss using IBM networking protocols such as Systems Network Architecture Distributed Services, Advanced Peer-to-Peer Communications and LU6.2, Messages are converted to the IBM documen formatting protocol, Document Content Architecture

The Disoss gateway can be accessed by personal computers attached to a Harris local-area network and by users of remote 9300s connected via Harris's electronic mail program. Harris's Perspective forms the common user interface for both the 9300-based electronic mail system and Disost

The Harris 9300 communications so tem supports personal computers, ASCII terminals and IBM 3270 terminals.

The Disoss gateway is priced at \$2,995. The gateway is available immedi-



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#### IBM buffers

CONTINUED FROM PAGE 41

fix the problem, it is being faulted for

taking so long Most fair-minded consultants admet that IBM has a mammoth job ahead and that the vendor is working hard at creating a transparent, user-friendly establishntwide networking system for users

and programmers alike One of the first breakthroughs was the introduction of LU6.2, a peer-to-peer networking protocol that provides a cun-sistent way for different IBM systems to communicate across a wide range of communications links. Unfortunately

from a programmer's point of view LU6.2 does not provide a consistent ap plications interface across different systerms - and developing such applications still requires generating a bunch of system-specific code

#### DDM designed to buffer uses IBM, realizing this, has introduced pro-

tocols designed to buffer the user the application programmer - from LU6.2. One grayor mattress of this type is

## Retailer shopping

By the time you put it in, it's obsolete The technology is never finished. For instance, T1 equipment vendors are making leaps over each other all the time, but I want to see the products, not the promhe added

T1 clocking issues caused Carter Hawley to drop MCI Communications Corp. as a vendor, Rothenberger said. "We had MCI. AT&T and Pacific Bell T1s, and we ran them into the PRX\_MCI wouldn't

#### Easier to deal with one vendor

Differences in the clock time of the private branch exchange (PBX) and the T1s sometimes for a half or full second, up to several hundred times ner hour. Problems like these reinforce Rothenberger's view that it is easier to deal with one vendor whose equipment will work, even if it is not on the leading edge of technology.

approximately two months. The organ:

zation recently installed the VTAM ver-

sion "because it provides increased re-

TSO- or VM-based product, explained

Mervin Adrian, who is a project manager

must be allocated for each user that is

allows users to download data "wathout

drawing from the TSO resource pool or

contending with TSO users, unless you

And even then it isn't a problem unless

to be simultaneously going

ist the same file." Adman noted

With TSO or VM, a lot of memory

The management of voice and data Linkware

The only drawback of the new Link ware product is that it does not provide di-CONTINUED FROM PAGE 41 rect access to VM files. Admin said Nothing but VM can get VM - that's of the Linkware Information Server for

#### the way IBM built it." he added Working on access to VM files

However, Shearson's systems personnel are working with Linkware to provide ac cess to VM files through the VTAMbased system, probably through a program that transfers VM files in MVS.

Adman speculated. The Linkware Information Server for MVS and VTAM supports existing sec nts systems such as RACF and ACF2. elementing the need for MIS managers to define and maintain additional logon and identification names as in TSO systems, Linkware said. The product is priced at between \$11,075 and \$35,000, depend ing on system configuration. PC software is noced at \$300.

Distributed Data Management (DOM). a "common, system-independent structure that allows application programs running on one system to access data files residing on another system," according

to IRM The product is billed as a way to solve the classic programmer's dilemma, as IBM states in a systems integrator's brochure: "If you want to share data among systems, you might use Cobol and write a pair of programs that talk to each other. Of course, if anything

changes on the systems, the program must get changed. . . . Soon you have a lot of communications applications." With ODM, prugrammers ideally can write an application once, and whatever changes are made on the networking level do not

affect that application But IBM does not stop there. On top of DDM there is Enhanced Connectivity Facility (ECF), which currently defines a tions functions for micro-to-mainframe links but is evolving into an umbrella architecture for distributed processing, some analysts say. That umbrells will pro

vide much of the underlying com tions functionality for R Star. IBM's networks is critical to future success with ISDN, Rothenberger said. "You have to start monitoning voice and data or you will

With separate voice systems, lines can fail without anyone noticing. But when ISDN comes with a single universal gateway to voice and data, if the lines fail "you'll go down and be out of husmess of you don't have them managed the same

Rothenberger said. Carter Hawley will soon start manag mg voice centrally, probably using AT&T's Call Management Systems soft-

ware on AT&T's 3BS processor, he added. While ISON services are still in the fu-

ture, it is imperative for MIS to become involved now, Rothenberger said. "Standards development is critical. We are the only user corporation in the General Interest Group of the T1 committee

Corporate users who do not get in volved will have no innut into developments. The other members of the com mittee are vendors, manufacturers and government agencies. "There should be more corporate users [mvolved] if they

much-heralded distributed relational data base management system By this time, the princess may be feelang a bit dizzy, situated as she is on bunch of mattresses labeled LU6.2 OOM and ECF - not to mention the common user interface that IBM promsees will run screen all of its systems

And users' unsecurity has been heightened by the fact that these layers are far from stable or complete. LU6.2 is

still a long way from replacing older 3270 terminal-oriented Systems Network Architecture protocols on the PC-to-host side — or Netbios in the PC local-area network domain. The current version of ECF uses the 3270-PC data stream, nor LU6.2. And IBM has yet to introduce a VTAM version of LU6.2

#### Stray products ground Meanwhile, there are several stray

products floating around that may or may not be blessed by IBM as part of the SAA architecture

Advanced Program-to- Program working (APPN), for instance, is an LU6.2-based program that allows a PC application to access data on a System/36 through several intermediate Sys-

want to have a say in the future," Rothenherger stated. MIS should also be merging with voice communications for control of the net-

Whether the voice or data people take over doesn't matter, but it has to be

tem/36 nodes IBM has limted that a 370 version of APPN is forthcoming -- which would provide yet another way for applications on IBM's three major product lines to talk

to each other across a distributed net Is it necessory?

Doubtless this will be cleared up in IBM's own good time. One remaining question, however, is: Are all of those layers really necessary in order to protect the princess from the pea?

It goes beyond aesthetics (that is the awkwardness of a towering pile of mattresses), to practical considerations such as. What is response time going to be like on a distributed network in which each n must go through LU6.2. OOM ECF plus a relational data base management system? And how many users can even a full-grown Personal System/2

support as distributed file server, if it has This is not a rhetorical question IBM. I really would like an answer.

Horwittin Computerwoold i serior editie

together." Rothenberger stressed

MIS managers should beware of at fecting response time while implementing new technologies, and they should also be prepared to retrain personnel in new techniques for using the networks, if nec essary, he added.

## LOOK FOR THE **BUY SELL SWAP** SECTION **FOLLOWING THE** EMPLOYMENT TODAY SECTION.

source efficiency.

logged on." he said Additionally, the VTAM-based system

#### N F W D 0 n UCT

#### Lacal-area netwark ardware

Network Systems Corp. has intro-duced its 3270 Multiswitch for users of IBM 3270 or asynchronous-type terms-

The 3270 Multiswitch is said to provide upors access from a 3270 terminal to multiple hosts, connections between 3270-type terminals and asynchronous hosts and sharing of controllers, modems, synchronous ports and other resources

by many terminals. Users can establish connections directly to multiple hosts without requests to a central data center. One Multiswitch supports up to 96 connections, depending on the mix of terminals, controllers an

hosts. Multiple switches can be connected locally via fiber-ontic or coavial cable. The 3270 Multiswitch is priced at

Network Systems, 7600 Boone Ave. Minneapolis, Minn, 55428.

Evered Enterprises, Inc. has unveiled the E2-200 Multidrop System, an RS-232C communications network for per sonal commeter-based data collection in distributed manufacturing environments.

Up to 16 sensil devices can be connect-local-area network (LAN) program is now ed to a single cable, which can span up to 4.000 ft, the vendor said Bar-code readers, data entry keypads

display terminals and computer-based test stations can be networked to provide a data collection system The network operates at rates up to

19.2K hit/sec The E2-200 Multidrop System is priced at \$795 per point. Evered Enterprises, 15811 8th Ave. N.E., Seattle, Wash. 98155.

Lacal-area netwark saftware

Waterloo Microsystems, Inc. has announced that its Port personal computer

available for the IBM Token-Ring net-

The Port PC LAN program enables IBM PCs, PC XTs, ATs and compatibles on an IBM Token-Ring network to share file, printer and communication re-sources. Each PC on the Port LAN regures an IBM Token-Ring network PC

Not only can a Port LAN contain dedicated servers but it also gives the user the option of using nondedicated servers and supporting distributed services with mul Port features include network man-

agement, security and the ability to run application programs sentten for IRM's Netbros and PC-DOS. The base price of the Port PC LAN

program is \$1,695. Waterloo Microsystems, Suite 200, 3597 Parkway Lane, Norcross, Ga.

Aggis Development Inc. has an nounced Diga, a telecommunications software program for Commodore Busi-

ness Machmes, Inc.'s Amga personal computer Diga is said to use a packet system to send and receive information. It confirms

file integrity after a transmission and receives any needed correction. Batch-file transfers are symplified with a file-color! deselect toggle. Other features include a terminal program that allows users to create custom

emulations, automated sessions and the ability to perform remote operations with password protection. Diga uses the vendor's Doubletalk file-transfer capability. Dura is proced at \$79.9%

Aegs Development, 2115 Pico Blvd. Santa Monica Calif 90405 Rabbit Software Corp. has

the 3770 Station-Plus, an IBM 3770 Remote Joh Fatry (RIF) software package for its Micro Plus MP14 and MP24 IRM Systams Natural Architectus adapter products that work with the IBM Personal Computer family. The 3770 Station-Plus can be used for alone RJE applications, coupled with Rabbit's 3270 remote workstation

products and installed on an IBM Netbios patible local-area network. The package emulates a 3770 console, 3770 card reader, 3770 card punch and up to three The 3770 Station-Plus costs \$395. Rabbit Software, Great Valley Corno

rate Center, 7 Great Valley Pkwy. E., Malvern, Pa. 19355

#### Network management

Infotron Systems Corp. has extended its line of INM Integrated Network Managers and enhanced the products network management and control capabilities to support the firm's Infostream Network Exchanges and INX Intelligent Switching Systems

The INM 400 provides single-point management and control capabilities for medium-size networks. It supports up to 1,600 channels at speeds of up to 9.6K bit/sec. The INM 1000 provides network management and control features for large networks. It supports up to 4,000 channels at speeds of up to 9.6K bit/sec Control capabilities of the network

managers include detection of problems Continued on page 50

IT'S OFF TOWORK



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Annter Technologies Inc. 99 Seath Street, Hopkinton, MA 01748. Annter. All you need to know about

3270 commectivity.



Continued/rom page 48 fault solution and service restoration. The INM 400 costs \$38,000. The

The INM 400 costs \$38,000. The INM 1000 costs \$48,000. Infotron Systems. Cherry Hill Indusrial Center-9. Cherry, Hill. N.J. 08003.

Comdesign, Inc. has announced the Network Assistant, an IBM Personal Computer AT-based network manager for the vendor's Future com systems Network Assistant is said to allow the

Network Assistant is and to allow the systems manager to access an entire network wa a centralased data base and reporting facility. It provides event and alarm logging, dynamic configuration and monitoring and data base management. The product can be customized to meet specific management requirements. Network Assistant is priced at \$2,500 for the first hornse per network, Comdesign, 751 S. Kellogg Ave., Go-

#### leta, Cald. 93117.

Netlink, Inc. has introduced Bisyne SNA Gate for interfacing bisynchronous devices to Systems Network Architecture (SNA) networks.

ture ISNA networks.

The Basyne SNA Gate is said to provide up to eight ports for interconnection of be-synchronous devices to SNA networks over direct, leased, multicaro or adulty lines. It accommodates up to two 9 6K buffer, lines or said. 4K btfsec, lines.

According to the vendor, Bosyne SNA Gate permits customarde configuration to

support a variety of bisynchronous terminal personalities and has the ability to support different protocols concurrently. It also allows centralized network management control.

Bisonic SNA Gate, is proced from

\$4,500. Netlink, 3214 Spring Forest Road, Raleigh, N.C. 27604.

## Protocol converters PCL Inc. has introduced Smartner

5250/T, a protocol converter said to connect up to seven asynchronous dewices to the twin-axial port of IBM System/34, 36 and 38 minicomputers. Smartinet 5250/T connects terminals, personal computers, printers and graphics devices. It supports more than 45 common asynchronous terminal types, including the IBM 3163, 3162, 3163 and 3164 and the Digital Equipment Corp. VIT00 and VIT20. Wide ond editing support are provided, enabling the user to connect 132 colb y 27-line asynchronous citylays to emulate IBM 3180 Motel. Perminsle. The converter also movedes

seven-color support. Smartnet 5250/T is priced at \$4.950. PCI, 26630 Agoura Road, Calabasas.

## Calif. 91302.

Communication Machinery Corp.
has introduced the Transerver, a network terminal server featuring up to 10
not18.

The Transerver features telephonestyle RI-45 adapters for terminal connection, it offers an integral transceiver and can be configured as data terminal equipment/data communications equipment offering modem support for both diol-in and dislators canobility.

The terminal server is said to implement the Department of Defense Internet family of communication protocols Prices for the Transerver range from \$1,695 for a four-port version to \$2,495 for 10 nexts.

Communication Machinery, 1421 State St., Sonta Barbara, Calif. 93101.

#### Modems/Multiplexers

Okidate his introduced the CLX96DP, a 9.6K bit/sec. synchronous modern for use over dial-up or dedicated telephone

The modem features automatic adaptive equalization providing compensation



#### Okidato's CLX96DP

for carried line conditions and complies with CCITT V.29 requirements, it operates in half-duplex mode on dial-up lines and half- or fulf-duplex mode on dedicated lines. The CLX96DP costs \$1.495.

Okadata, 532 Fellowship Road, Mount Laurel, N.J. 08054.

Luxcom, Inc. has announced its Model 1105A IBM Type A channel unit. The unit is said to provide conxid-to-

optical-fiber multiplexing capabilities with the IBM 3174 controller. It provides direct coasal connection to a standard 3174 controller configured with four ports.

At the device end, the product pro-

At the device end, the product provides connections for up to four IBM 3299 coaxoal multiplexers that support up to eight 3270 devices each. The 1105A supports a fully loaded 3174 controller and lists at \$795.

Luxcom, P.O. Box 57045. 3853 Breakwater Ave., Hayward, Calif. 94545 APRIL 27. 1987

## C.Itoh Runs In The Best Of Company.

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poke either. In technology or speed, At top gun, it runs all day and night in data processing mode at 400 cps, as well as 87.5 cps for letter quality output. Not to mention higher graphics speeds for bar codes, forms and charts. And the view doesn't stop here. C.Itoh's terminals are the perfect blend of price and performance and of quality and reliability. Pound for pound, there's none better. Nor more DEC-compatible. Like our CIT224 terminal — completely VT220-

compatible but with more desirable features, including a 14-inch screen, a 10 x 16 character cell, 11 set-up menus and 45 programmable key functions. And the CITIOIXL — to keep the fires burning in the VT100 market, Again, 100% compatible. But heavier on

features than any alternative available. Even if DEC was still making its VT100. C.Itoh's printers and terminals. You have to be pretty sood to run with C.Itoh.

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## In Retirement Memories Abound



## **Retire Your PC Coax Connection**

The PC-to-host coax connection. She was a good piece of equipment working with coax cable and cluster controllers, but time just passed her by. End users started needing more than simple host access. They also needed their PCs to share resources around the office. That's when local area networks care along to fill the need.

LNS are dramatically increasing office productivity through efforts information management. And Gate ways are epithing LNN versatility by providing cost-effective host communication for PCs and other network devices. Now for thousands of dellars less LANs and Gate-ways provide PC-to-PC and PC-to-host communications all without a cluster controller.

INS Gateway PC Adapters are engineered around proven INS SNA 3274 cluster controller emulation. A single INS Gateway PC Adapter in an IBM NETBIOS compatible LAV, including Tokern Ring, will support up to 32 logical unit sessions: The LAV allows each PC on the network to share disks, printers and other resources while the Gateway allows performance of any host-supported function and maintains host access.

INS planned on PCs becoming a major component in the development of information systems. We designed our Gateways to

be the logical choice in providing the vital link between LANs and mainfaines. We also planned on much more—flexibility, simplicity and reliability. We provide free, responsive user assistance and guarantee every INS Gateway PC Adapter (hardware and software) for five years.

Now the vast resources of mainframes and local area networks are available at your fingertips with INS Gateway PC Adapters

Call now for more information about putting new life in your MIS/DP efforts with INS Gateway PC Adapters Our toll free number is (800) SNA-3270, in Alabama (205) 633-3270. Or write Integrated Network Systems, P.O. Box 91395, Mobile, AL 36691 Telex. 701238



"THE NETWORK PEOPLE"

## **We're the largest indepen Which is surprising since w merging with** *i*

Over the past 25 years, a collection of companies has provided businesses with a powerful array of equipment and services. But Codex has provided something even more powerful.

Our ability to combine such various computer and transmission technologies into a single, productive, efficient communications tool has been the secret of our success.

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> Being part of the solution is sometimes the solution itself

Ar Codex, we realize that solving communications problems will involve contribunons from a variety of vendors. The contribution we want to make is to tie those disparate elements tosether into an efficient network and then give you the tools with which to manage that network on an ongoing

Perhaps Codex' great-

est advantage is our independence. We're not a computer company. We're not a phone company. We're a network company. So, in our 25 years of designing network solutions, we've worked with all sorts of equipment companies. And we've worked in countries all over the world. So we

functionality of all the pieces of your network, regardless of which vendors they came from. Or where they are.

But simply designing solutions isn't all we do. We also support our solutions with a wide breadth of networking products. Our history of innovative product capabilities means you're getting reliable, high-quality communications products that will make your particular network as productive as possible. Because we address a variety of areas, we're never in a position of trying to force fit a particular technology into a solution. So we're able to analyze your needs objectively. The result? A productive, efficient network. Which, after all, is the only kind of network anyone wants.

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Compatibility isn't the only issue facing you when you set out to solve network problems.

The fact is, your network constitutes



We can show you how a Codex networking design can be more transposition and more treaductor

husiness And so it is absolutely critical that

Because we have merged their products with our specialized communications expertise to create the most powerful business tool of all:

A nerwork

can maximize the performance and

## **dent networking company.** e've spent the past 25 years **BM** and **DEC**.

that investment is protected. At Codex, this is one of our



Cotenham partired pedalot of new ring solution. Whe

We understand that a network solution has to be capable of accommodating growth. Better yet, we actually design our networks so that they can spark growth within your company - helping to drive it by being a vital and powerful corporate resource.

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To help us

further accom-

modate your

company's fu-

ture growth.

Codex is very

active in indus-

of "open architecture" that will allow you to link equipment from many vendors in a more productive way. With that kind of support, your network will be able to grow by leaps and bounds. And your business along with it.

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munications survey, many of these and other companies consistently ranked Codex first as the networking vendor they preferred in categories ranging from best price/performance

to technology to customer support. And of course, beside working for successful companies, we're also backed by a successful company -Motorola

How can you find out what Codex can do for your applications? You can start by calling Codex at 1-800-426-1212, Ext 247. Or write

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We'll be happy to send you a



Communications - an informative guide to the ins and ours of networking based on our extensive experience.

Of course, the book should be informative. After all, it took 25 years townte



The Networking Experts

Focum Systems has introduced the Focum 1600 Series 8 Channel Multi-

plexer The Focum 1600 is said to be compati ble with the IBM 3270. It can be used in point-to-point, star or multidrop configurations. The remote unit utilizes two-way fiber-optic cable, and terminals can be lo-

cated up to one mile from the controller Operation is said to be transparent to the input data at 2.4M bit/sec. Transmit. receive and power status indicators are

The Focum 1600 costs \$1.495 Focum Systems, 160 Speen St., Framingham, Mass. 01701.

Racal-Vadic, Inc. has announced 2400PA Model 2, an enhanced version

of the 2400 PA 2.400 before full-denier

The modern is said to feature front panel control, an eight-character LCD, a built-in speaker, multiprotocol automati duler and compatibility with the vendor's

ATPhis command set. The device operates at 2,400. 1.200 or 300 bit/sec. synchronously or asyn-

The 2400PA Model 2 is priced at Racai-Vadic, 1525 McCarthy Blvd.,

Milpitas, Calif. 95035. Eicon Technology Corp. has introduced the Dial Network Adapter, an in-

The Dial Network Adapter is V.22

bus-compatible and permits synchronous. full-duplex 2,400 bit/sec. access to CCITT X.25 packet-switched data networks.

Users can establish up to 32 concur-

Features include the ability to program telephone numbers, automatic dialing and automatic storing. The Dial Network Adapter is included

with Eicon's communications gateway products. Prices start at \$1,295. Eacon Technology, 3452 Ashby St., Montreal, Canada H4R 2C1.

Gandalf Data, Inc. has announced the LDS 720. a two-wire short-haul mo-

The modern is said to provide synchro-

nous or asynchronous data transport at speeds of up to 19.2K bit/sec. It is autoequalized and can transmit and receive data between users and computing resources up to 7.9 miles apart, the vendor

The LDS 720 is available as a standalone for \$595. As a rack-mount card for computer room use, it is priced at \$570, the vendor said. Up to 14 cards fit in a

Gandalf Data, 1020 S Noel, Wheeling. IL 60090.

standard 19-in, rack



#### Cabling

Electro Standards Laboratory, Inc. has introduced the Series 7000 line of rack-mount A and B switch modules. The Model 7001 provides A and B

switching of the RS-232 data interface. The Model 7010 power and control module provides power for up to 12 Model

7001 electronic switch modules. The Model 7001 front-panel momentary toggle switch transfers the common device signals to the port A or B device. The Model 7010 power and control module features simultaneous switching of all

Model 7001 switch modules it supports. The Model 7001 costs \$225, and the Model 7010 costs \$295 Electro Standards Laboratory, P.O. Box 9144. Providence, R.I. 02940.

Patton Electronics Co. has announced the Model 400 coaxial, Model 410 twinaxial and Model 420 dual-coaxi-

al devices The devices are said to allow IBM 3270, IBM System/34, 36 and 38 and Wang Laboratories, Inc. dual-coaxial systems to use standard telephone wiring be

tween computers and terminals. The units are said to be able to use er ther standard RI-11 modular telephone plugs or a screw-type terminal block to connect telephone wire to the baluns. Prices start at \$29.50.

Patton Electronics, 11129 Arroyo Drive, Rockville, Md. 20852.

#### American Lightwave Systems, Inc. has announced the FT1300, a 16-channel fiber-ontic system.

Each channel of the FT1300 is said to be capable of carrying either one uncompressed video channel, a DS3 trunking channel, seven DS1 channels or a comb nation of FDM channels compatible with househand local area networks. Any mixof video, DS3/DS1 and FDM data channels is possible concurrently, the vendor said. Transmission is possible up to 20km.

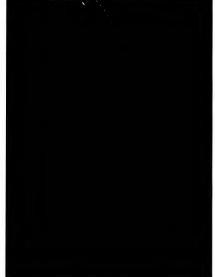
The FT1300 carries 16 uncompressed video channels at a cost of \$6,000 per channel, plus fiber. American Lightwave Systems, P.O. Box 1549, 358 Hall Ave., Wallingford,

Conn. 05492.



#### COMPUTERWORLD

## T1 TECHNOLOGY



T1 transmission facilities open up new vistas of capacity and efficiency, but this route is not yet heavily traveled, and there are some tricky spots along the way, especially where private networks intersect with public services.

APRIL 27, 1987 . SPOTLIGHT NO. 7

JALING

Computerworld SPOTLIGHT covers one product or service category in-depth to help you make important purchase decisions faster and more efficiently. And, if you need even more information...

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Please note: You will be asked to use the "star" (\*) and the "pound" (#) symbols on your touch-tone telephone set during your telephone call.

4. When prompted by the recording, enter your DIAL-INQ subscriber code and symbols as recorded below.

5.	When the recording says, "Enter magazine code and issue code," enter these numbers and sym-
٠.	and issue code, enter these numbers and sym- bols:
	11 4 5 8 7 11 7 8 8

6 You will be prompted to enter the DIAL-INQ reader service number, including the the symbols, for the first product/service you've identified below. You will be prompted to repeat this step as needed to input additional DIAL-INQ numbers.

1	10.
2	11. 🗆 🗆 🗷 🗷
3.	12.
4	13. 🗌 🗎 🕒 🗗
5	14.
6	15.
7	16. 🗆 🗆 🗗 🗗
8	17.

7 Complete your phone call by entering the following symbols:

9. . . . .

You've now successfully completed your inquiry call to Computerworld DIAL-INC. Remember . . . you can make as many phone calls as you wish — and request information about products/services in any SPOTILIGHT section up to three months after this issue's published date.



#### INSIDE

#### **Jitter Bugs**

Data communications professionals involved in T1 lines would be wise to acquaint themselves with the more common operating constraints. Page S2.

#### Timing is All

Error-free transmission depends on synchronization of network components, but vendor support is not keeping step with user requirements in this critical area. Page 58.

#### Vendor Viewpoint

Customer-premise equipment will have to keep up with a market moving to higher capacity, greater efficiency and the blending of private and public networks. Page S9.

#### Beyond T1

The T1 data transmission rate of 1.544M bit/sec. is just the lowest common denominator in digital transmission. Multiple 1.544M bit/sec, channels can be biended into higher rate bit streams, Page \$10.

#### Pipe Checking

Fueled by the T1 marketplace, demand for channelaccess test equipment is getting stronger, Page \$12.

#### Product Charts

A comprehensive guide to T1 multiplexers. Page

A listing of statistical multiplexer products. Page \$15

## Joanne Kelleher ASSOCIATE EDITOR Penny Janzen

RESEARCHER Sally Cusack DESIGN EDITOR Marjorie Magowan ASSISTANT RESEARCHER

Bonnie MacKeil

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Robert J. Herko/
The Image Bank

Copenghi 1987 bi (W. Loremunica Lienalla, All mghi reserved. Reprodution of material pipersong of corresporward Specific in forbides surbost writin primation. Solid 38 prospers in Navy Statesin, CW. Communications (e. Bu. 9817 1375 Confessator Road Francigham MS 0378 1917. You don't need deep pockets to be a candidate for the extra quality and flexibility of T1 transmission facilities.

## BUYING ROOM FOR GROWTH

BY ROBERT DAYTON



I is not a technology that works only for the Fortune 500.
Economy is usually the reason organizations are drawn toward consideration of T1, and the cost-saving benefits of this class of communications services are as a variable to the mid-size commercial consumer as to the large.

Clackamas County, Ore., for example, saved almost \$40,000 by opting to use T1. Faced with annual increases in the cost of leasing analog tie trunks, the county signed a five-year lease contract in July 1986 for a Siemens. Suters III diputal private branch ex-harge (PRIXI mericked to ther ET III.es.).

Semens Information Systems, Inc., maker of Cackinanis County's PIX, treatif found savings in axing T1 as wall, even spanning short distances, Semens shifted to T1 have for 55 of the 58 links, connecting the seven buildings located at its 56 acre headquarters in Bock Ration, FIA, T1 insplementation costs will be paid back in 18 months, after which the firms savin will readure a symmetry.

\$28,000 per year.
Although "IT" once referred to a type of carner equipment, it is now the designation for all
\$1,544 Malysic, degulal services, whether the line
is were, microwave or fiber T1 is economical for a
mumber of reasons, including the savings derived
from bundled transmission and the bynasonig of
being these company across clarings. The lismodel of the price of the price of
and additional circuits are available for the price
of a couple of channel circlis.

This leads to another benefit, the leeway to add circuits as they are needed instead of waiting for the telephone company to grind through its paperwork. Seasonal growth is a breeze when there are no installation charges every time a circuit is added.

Dayton is founder of Dayton Associates Communications, Consultants for a tales communications consultancy based in Flemington, N.J. He specialises in digital communications and outcomer premise equipment. so considered a more significant advantage than the \$112,000 s year Robert Yannocene, director of data communications. Says the institution salves on data circusts alone. Pace as currently using only about half the bandworth a valiable on the TL network that connects as four city campases, according to Vannocene and that leaves perity of room for implementation of ideas like full-notion video teleconferencing among campus locations.

There are also qualitative reasons for considering T.I. Beads lower prices and ball-quantitive handwidth, TI offers craper and cleaner communication Transmission qualities of a 64K bit/see. Pube Code Modulation (PCM) circuit is insuranced by the code Modulation (PCM) circuit is insuranced by any other method. The transmission level is flan between 300Hz and 3,400Hz. This more fittle become moderns must at their top data speed. It also means talking over a circuit on which one cannot be provided to the control of the control o

On analog lanes, it is frequently possible to gauge the distance of a call by the level of interference. Piber-optic circuits also have some thermal noise, but the level is so low that it is virtuilly undetectable. Use 64K bilger PCM with fiberoptic facilities, and you can practice dropping paslike the actors in the U.S. Sprint ads.

In the past couple of years, public telephone networks have also begun offering a number of services that make T1 use even more attractive. In 1985, AT&T introduced two services called Megacom and Megacom 800, which use a T1 fine.

## **Buying room**

to get to the long-distance net work. The T1 line basically elem nated the local telephone com switch that handled the WATS and toil-free service lines. Some of the handling functions of that end-office switch premise multiplexer or the PBX

AT&T originally offered a Duntal Channel Bank (D-Bank) multiplexer in central offices as a means of fanning out voice cirunts from a costomer's T1 line Customers, however, wanted data circuit fan-out too. And eventually at did become possible for T1 servers to have data orcuits connect ed into Digital Data Service (DDS) at a limited

Manufacturers are redesigning equipment to interface with the integration of telephone company services. Integrating services on the same T1 how provides even greater economy. Instead of individual lines for each serice, the services are but dled together on one T1

indling and routing At the telephone company's of fice, the T1 line interfaces with AT&T's Digital Access Cross onnect System (DACS) The unbundles the services first. Then it rebundles similar services on T1 lines to other equipment or offices. Voice servaces such as WATS and 80th chines DDSs route to another DACS or digetal data switch dedi-

Now, not only AT&T but oth er long-distance carmers offer a service that gives T1 customers access to electronic cross connection equipment AT&T offers a service rolled Reconfiguration. and Bell Atlants, Corp. of iers Flexcom Both ser vices provide control dedicated DACS. The divested Bell operating connames reter to them as Cross-Connect

What constitutes DACS compatibility? It is the multiplexer's ur PBX's ability to com with a DACS at a 64K bit/s DS0 level. Central-office DACS allow the customer to switch T1 to other T1s. While DACS are designed to switch at the 64K bit/sec level, customers can also switch the entire Tl service or groups (bundles) of time slots. The advantage of this is particularly evident for disasrestoration

Often the best of two worlds occurs when private networks combine with public network services. Private networks offer the user total control: however. he is also responsible for troubleshooting, training and providing snore equipment. With a public network, the user abandons con-

Integrating a private network with a public one allows the user to maintain a portion of control of the network while obtaining the benefits of a single clock source from the telephone com-

The equipment list After some preliminary economic studies have been made, it is time to detail all the equipment



Robert Yannocone, Pace University that will be needed. Simple

things like connecting cables cannot be uverlooked. A number of manufacturers make special cords for data lead turnovers as the only method of interfacing with their unit. It is critical to pay attention to such interfaces When ordering equipment for

an installation, he sure to include channel service trade (CSU) for each termination of the T1 line. Local telephone companies are installing fiber-optic cable in most locations. Request information from them as to the type of interface they are going to

NTEGRATING a private network with a public one allows the user to maintain a portion of control of the network while obtaining the benefits of a single clock source from the telephone company.

provide and the need for a CSU prices range between \$1,000 and \$2,000

Until recently, the telephone ompanies were required to prothur central office. The downt ed bell operating companies ob ect to this practice for a number of reasons, the onman one being that they receive no payment for supplying this power. As local companies move toward exten sive fiber-optic installations, a selt-powering CSU requirement

is immoent. consider is the CSICs ability to

provide the Extended Superframe Formar (ESF) to the line. While the price of the additional from between \$500 and \$1,000 the benefits of being able to quickly localize troubles will soon override the expense.

CSU's with ESF lake a data stream with a D4-frame format and replace the frame segmence with an ESF. A number of registers store data in 15-min. sep ments over a 24-bour period Installation of ESF started in 1986 but may take another cou

ple of years to be completely deployed by all of the public net works. MCI Comm Corp. says its Digital Data Net work will employ ESF technology by the middle

of this year. Contrary to some yen dors' claims, there is not Data Service Una (DSU) for T1. DDS/DSU functions, like clock recovery, are a part of the multi covery is a function of the terroinal, the CSI and the T1 line are considered so

Isochronous tran sion is serial-binary data in which the data terminal comment derives clock from mooming data. Synbinary data in which the data communications equipment provides the terminal clock If ESF is used, there is proba-

bly no need to purchase equipment to test the T1 line Available data test equipment would still be used for the data of test sets are available for T1 Almost all are for the D-Bank technology multiplexers and would not be of any use with bitinterleaved multiplexers Host-to-host transmission at

1.544M bit/sex, may need a mass storage data scope similar to Telenex Corp's I-Scope Tekeles offers the Chameleon 32 Proto-Semulator/Analyzer that supports the Integrated Services Digital Network Primars Rate-based

#### Skill levels

Multiplexers, a major coa in any communications network gear are not easily bought. To begin with, there are more than 50 vendors in the market; some times with multiple offerings. However, some multiplexers are now being invested with powers that go well beyond the traditronal definition. In fact, it is nos-

sible to divide the entire multiplexer market into three broad and high-end. The low-end includes the 24-

channel digital channel banks. These banks adhere to all the specifications of the 1982 Reil

## Beware of jitters and error bursts

sociated with T1 multiplexers and transmission about which data communications professionals should be forewarmed. One well-documented al though attle understood, quirk

of the technology is something called "pitter." Jitter is the difference between ideal and actual ar rival times for digital pulses. It is something on the network and is cumulative from end to end A major cause of jutter is the

45M-byte multiplexer that adds bus to compensate for differences in the timing on T1 lines Another group of offenders is the repeaters or regenerators on the access line to the customer Each repeater recovers its inter-The circuitry to recover the clock has an inherent after characteristic. Since inter is cumula tive, every additional repeater means a higher magnitude of µtter. Multiplexers that can meet the tolerance level will fall

Unide analog transmission in which errors but randomly and transmission suffers from error bursts. Digital transmission will not incur an error for hours, days or weeks and then will gush out a stream of them. Bursts can be aused by microwave systems witching to a protection service or from human arror. Durature an range from a few millisecands to several seconds. Multiplexers going into retrain may produce strange sounds on your Product selection should, therefore, include listening to the voice circuits under

Another constraint 's Superframe integrity. A telephone network requirement is multiplexers use a D4 or Extend d Superframe (ESF) form This means that every 193rd bit will have a framing pattern bit in serted. Some manufacturers of

both normal and failure/retrain

place their own framing informatron in relation to the T1 framme pattern. The Superframe pattern. D4 or ESF, sem by one unit nust be in the same order at the other end. If the service is point-to

point, maintaining end-to-end Superframe integrity is not a ornhlem. When the same service connects to AT&T's Digital Ac-Cross-Connect Systems (DACS) link for disaster restora the customer-premise equipment will fall out of syn chronization. A DACS inserts a new Superframe pattern that will almost certainly shift the customer-prenuse equipment's

own framing pattern nut of the expected location

Customer-premise ment vandors advertise that their units are compatible with DACS and AT&T's Customer Controlled Reconfiguration They may mean their unit can through a DACS at the 1.544M bit/sec level only To be truly DACS compatible, the multiplever must be formatted in 8 hit bytes that form a basic build mg block of 64K bit/sec. DACS design switches at the 64K bit/ sec, level. When a DACS switch es at the full 1.544M htt/sec., it does it by switching 24 64K bit/-

sectime slots Analog data using a switched voice channel may use robbedbit signaling, Robbed-bit signal ing for supervision takes the sixth 8-bit byte for the particular channel The customer premise equipment multiplexer inserts a

IGITAL. transmission will not incur an error for hours, days or weeks and then will gush out a stream of them

signaling bit in the proper locations in the Superframe DACS equipment then pulls off the sigraing mformation. It waits to insert it in the proper spot in the outgoing frame. This process degrades the overall quality a frac rectal tensors. Robbadaha with multiple DACS in tandem may degrade quality discernible Still another network care straint is the requirement for

opes-density. However though ones-density is still necessary to preserve the health of older repeaters on the T1 access lines, today's repeaters can tolerate longer periods of mactivity owers circuit. AT&T launched a program in

986 to change its network from a 64K-byte ones-density systto a 1.544M-byte system. At the DS1 level, ones-density uses by polar eight-zero suppression. better known as B8ZS. Veribnk Corp. introduced a device that uses a zero-bote time-slot interchange method that removes a string of eight-zeros and inserts a coded word to tell the other end where to out the removed zeros. Both methods will probably fade as more lucal telephone networks convert to fiber-ontic cable .

ROBERT DAYTON

at the 1.544M-bit level.

wase indicate an error

same polarity

Alternate mark inversion (AMI) - The

signal used on T1 lines that transmits on

method violation that occurs when consecut

ones" do not invert polarity but are of the

Bundles - A term used to describe

When used with Adaptive Differential Pulse

Clear channel canability - A term used

Some manufacturers place a one-bit at every

oun of 64 K-bit turne slots in the T1 facility

Code Modulation transcoders, it refers to six

to mean that the 64K-bit time slot does not need

eighth-bit location to meet the ones-density r

quirement. This means there is another 192K.

64K bit/sec. time slots or 384K bit/sec

#### **Buying room** FROM PREVIOUS PAGE

System Technical Reference PUB 43801. Since their design ts simple, the 24-channel bank cost is the lowest and their mean time between failure is the highest. Prices range from .000 to \$10,000.

Mid-range multiplexers provide some limited networking capability. Drop-and-insert features allow some efficiencies in a three-point network. This feature is similar to the central-office DACS. It can switch a channel from one T1 line to another

Some vendors call this capability "drop and insert." and oth-ers call it "bypass." Its main advantage is that it quickly adds flexibility at the customer's premises by allowing some curcuits to pass through an interme-

Nevertheless, an outage at the intermediate location will also take down the circuits than were passing through at the time. Other disadvantages are possible clocking problems and the necessity to acquire additienal access lines. Prices for the mid-range multiplexers range

from \$10,000 to \$75,000 The high end of the multiplex er market represents the fastest growing segment. Because their prices can run as high as-\$250,000 a unit, these are becoming the flagship product of vendors. It makes sense to spend the time selling one of these high-end devices anstead of sell-

ing 25 low-end products. High-end units provide netmanagement software. They can reconfigure the entire notwork when a T1 less is onen High-end units also provide a very high level of network control, which is appealing to some

There are, however, disad vantages attached to these products, beyond their weighty price tags. A control channel for the commands and diagnostics will use up to 16K bu/sec, of handwidth. Rerouting data circuits can result in excessively long distances that will change your re sponse time. Before rerouting any circuits, it is best to deter mine how long the facilities will be out. Priority of the circuits and the available handwidth on the other T1 lines will determine

#### when to start reconfiguration secting a multiplexer

T1 multiplexers use two framing formats. The basic frame format the telephone companies have been using since 1962 is D-Bank. gether. All digital equipment in the telephone office uses the basee building block of 8-bit bytes. sent 8,000 times per second Building blocks of 64K bit/sec (8-bit bytes multiplied by 8,000 times per second) are also the

foundation of the Consultative Committee on International Telephony and Telegraphy standard. Digital PBXs with T1 interfaces use this method to communicate with telephone

witches During the latter part of the 1960s, data communications manufacturers introduced bit interleaving for synchronous mul

tiplexers. Bit-interleaving re-duced the delay through the equipment and, to a degree, in proved its efficiency Asynchropous multiplexers use a characcer

While bet-interleaved multiplexers are more efficient than byte-interleaved, they can com municate only with another uni of the same product. Each bit-in terleaved multiplexer has its own proprietary frame format Once you have chosen a particu lar vendor, you are locked into its technology. Ut can be similar to selecting a personal computer

and finding out it does not work with anything else.) Several locations are trying a new technology, called wideband, or fast packet. Stratacom Inc. announced Integrated Pack et Exchange a T1 nacket mults

plexer. An assumption made by fast-packet users is that analog data modems account for a very mail part of communications, an assumption that has been proven wrong. While the concept of fast packet is writhy, it may not be

TI market growth



fully accepted because of analog Users often lose suchs of the fact that they should consider both frame structure and framing pattern. While frame structure refers to whether a multiplexer is byte-interleaved bin

interleaved or packet, framing pattern refers to the particular bet configuration micerted in exery 193rd-bit noution as ruguired by the telephone tariff Public networks usually require a framing pattern to be en ther a D4 - the digital change bank frammig pattern - or ESF However, private networks on microwave systems do not need Bipolar eight-zero suppression - Reves the requirement for ones-density at the

Phrase guide to the language of T1

tive one-bits by inverting the polarity of each D4 frame format - Refers to a particular bit. Zeros are represented by time, not by with ittern (100011011100) that appears our bit at a time in the 193rd bit position of the Somer-

Each D4 Superframe has 12 main frames at 64K-bit level by sending a bipolar violation code 192 bits in length. This pattern accounts for 8K-bits out of the 1.544M-bits leaving nnly This method requires alterations of coun-1 536M-bits for information.

bits of overhead that are used just for one-sien

nt at the telephone office that would other-Echo cancelers - Cancels a decornolis echo that occurs when networks exceed 1.850 Bipolar violations - An AMJ coding actual miles and there is a four-wire to two-wire

Echo cancelers digitally rensuve an echo to a point where it cannot be perceived At one time, bipolar violations were the only Error-free seconds - Error persormance

way that telephone companies could tell d there of the T1 service expressed in terms of the perwas a bit slip or hit on their lines. This method is centage of seconds in a day in which there are no currently being phased out by Extended Super-Conversely, errored secunds are the number

seconds that do have errors Ones-density - A long-standing require ment to provide enough AMI signals with enough 'ones' to maintain the clock recovery of repeaters

Primary channel - A name for the Ti line that is formatted in the Integrated Services Digital Network method of 23-B — or information 64K-bit —time slots plus one D — or sag

> ROBERT DAYTON secondary channels around 3

framing pattern Subrate data multiplexers are st now coming on the market This technology growdes users

with an economical way to add 2.400. 4.8K and 9.6K bit/sec synchronous data to DiBank technology, AT&T Technology Systems provides a digital data bank unit that can plug into a

standard D4-Bank. This plug-in uses the standard framing pattern used with DDS Subrate new alternative to provid my DDS without hard hauling to one of the DDS

While subrate multi plexers are still not as effi cient as bit-interleaved onite they lead to a stable which is appealing to some design that is based on a standard. Private netcompanies. works do not have to wir-

ry about standards. As in as you connect into the telephone networks, however standards are the only way of life. Although restrictive and inefficient, standards provide a means of hopping among net-Also, a number of vendors

w make compatible equipment, providing several sources from which to choose in addtion, standard technology has ing had most of the bugs re-

Proprietary technology can metinies lead to unforeseen prublems. One large communi cations company that selected a one-of-a-kind multiplexer spent

the year antisyng Band-Aids to all the trouble spots before the network was operable

ngy can be like buying a foreign car with a name nobody can pronounce and having it sputter at 3 a.m. miles away from the nearest dealer. No doubt your next niece of equatment will been m terchangeable parts that are

IGH-END units provide network management software. They can reconfigure the entire network when a T1 line is open. Highend units also provide a very high level of network control,

stocked everywhere Before plunging into a T1 in

stallation, several points deserve consideration. One includes all the transmission constraints that the marketme represents tives may forget to mention. Multiplexers that use analog

to-digital coding schemes, other than PCM, may present analog data transmission problems There is one design that limits the upper frequencies of the voice-grade channels to some thing that approaches 2 8 KHz Limited frequency performs a

magic in the coding meth nd While most users may not notice any difference in a voice cor nection, data sets with

KHz would suffer Analog-10-digital nusheds provide the user with varying levels of analog data per anie Agam, 64K brt. PCM is the industry standard You can use multiple or tandem converging of analog to digital at 9 6K bitoes.

Continuous Slope Delta (CVSD) modulation appears in many multiplexers. Its inherent noise level will permit only 4 8K bit/sec analog data on one conversion, and multiple conversions will not carry that rate Classis that some compression methods can transmit 9 6K bitises, are not realistic. It is one thing to run

CVSD deteriorates on a inear scale from acceptable -approximately 40K bif/sec - to arely acceptable at 16K bit/sex. At 32K bit/sex., there is a dis ernable quantizing noise which makes it subjectively lower in quality to the new ADPCM say

Adaptive Differential PCM (ADPCM) has finally become a worldwele standard. The Exchange Carriers Association and CCITT adopted a revised standard in September 1989

Before this ADPCM methds would not allow the use of versational mode. A number of ADPCM methods sold are not compatible with the standard.

nor are they of the same quality. When selecting a product with ADPCM make sure the deson meets the 1986 standard Subjective tests show there is no perceived difference between oice at 64K bit/sec. PCM and standard 32K bit/sec.

ADPCM signal. ADPCM detenrates dramatically at less than 32K bit/sec. Analog data signals up to 4.8K bit/sec. can undergo hree or four transcodings. Modems that use the new trells coding methods for forward error correcting would be able to consort 9.6K he/sec Moderns that utilize the CCITT V.29 modulation will not provide sat-

isfactory performance, even section, according to AT&T Bell Laboratories. Other 32K bit/sec. coding methods use various coding methods. Nearly Instantaneous Companding and Variable Quantung Level have less quantizing noise than the CVSD signal They are also considered subjecely lower in quality to the standard ADPCM signal

EW CODING methods appear in technical papers almost daily. Most of them would present problems to analog data modems.

Two emerging coding methods are Variable Companding PCM and Digital Multiplexer Increased Catability. New coding methods appear in technical napers almost daily. Most of them would present problems to analog data modems.

ome multiplexer manufacturers use Digital Speech Interpolation (DSI) along with 32K number of voice channels. DSI has an inberent chipping charactensuc and may interfere with analog data modem perfor

The point to keep in mind is that 32K bit/sec, and slower voice channels present problems to analog data at the same time that analog data modems are becoming faster and cheaper. They wil always be around, operating at higher and higher speeds.

It is also important to question vendors closely when they claim DACS compatibility. Unframed customer-premise terminals will not work with a

should also format into 8-bit wtes to switch at a DS0 level Multiplexers that have formats other than 8-bit bytes cannot have channels switched at a DS0 level. Bitanterleaved multiplex ers cannot interface with a DACS at the 64K bit/sec level. If the multiplexer is software driven, users may be able to form some channels into an 8-bit

byte format. Some multiplexers group channels into hundles that are equal to bewteen five and eight time slots. As long as the information is in multiples of 64K his /sec. time slots, the DACS will transfer the data without error If you plan to include telephone company DACS equipment, there are still other assues

Bell System Technical Reference PLB 43801. These alarms notify the user of a trouble condtion and control the signaling supervision of the individual cir-

Something else to remember is that T1 lines often are twice as

long as the airline mileage be nal equipment should respond to tween points. The longer dis the various alarms from the nettance and the necessary addiwork equipment, as specified in tional equipment will cause the response time to suffer Cetting into the larger nodal networks will add to your frustration. If the circuits on one of the T1 lines re route to another line, chances are your response time will sur-

pass the limits. A rule of thumb in figuring delay along the facilities is a factor of 1 msec per 100 miles. To be on the safe side, consider the acrual distance to be 2½ times the

arrive distance Some planners get carned away when they begin designing networks. They try to place the multiplexers behind each other to really pack the T1 line and show greater economy. This leads to what can be called

Introducing the Cohesive T1 network

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#### SPOTLIGHT

the "ripple effect."

An airline company placed 56K bit/sec. multiplexers behind a T1 multiplexer and fed the T1 multiplexer into an ADDCM transcoder. A two-second error burst on the T1 line resulted in 10-second outages for the com puter port and the distant termi-

nally, all the units would be in First, the T1 line would go synchronization, and the cominto an alarm condition. Next puter and terminal would get a

the ADPCM, then the T1 multiplexer picked up the alerts and finally the 56K bit/sec. multiplexers, just as if someone had and watched the ripples go out. After the T1 line retrains and is back in synchronization, the ADPCM units would retrain. Fi-

Clear To Send indication - another time-consuming ripple ef-An even more serious mis-

take for a company venturing into T1 is the failure to consider both voice and data personnel In the past, telecommunica tions groups controlled the voice

circuits, and MIS managed the data circuits. With the advent of T1, however, integration of use on voice circuits is guess

voice and data services and management makes economic sense. The only catch lies in making sure the interests of both are ad-

equately represented. In one sense, input from the young side is more control because digital data connections to multiplexers are a known entity and can be planned for, while the amount of analog data modern

work at best. But, for really sat infactory results, a balance of representation is imperative.

Why this is so important is illustrated by the problems expemenced by another large comthat munications company integrated two distinct networks work was completely analog voice: the other digital data. Suddenly, analog voice-testing personnel with no digital servicetesting experience were responsible for testing digital services for the data group.

#### which was 2.500 miles away A modest downside

The greatest deterrent to using your eggs in one basket. If the T1 line or the premise equip ment is in trouble, then a lot of service ones with it

lines improve the uptime for companies with critical data needs. Get an early agreement with the T1 carrier that its tech

#### T1 multiplexer market Sales and pricing frends



meians will treat the T1 line on a priority basis. Typical telephone company trouble-clearance practice is based strictly on First-In, First-Out priority. Reports of monor service outages take precedence if they arrive in the queue before your crisis.

Planning for a T1 network Even if there is only a small economic advantage, the chance of lower cost facilities is great. Dueital services of 6M and 45M bitsec. are being introduced by a number of companies Pricing for a 45M bit/sec, service is cost effective, and its crossover point ts just seven T1 lines, leaving 21

Proceedings of this kind of wild. ed capacity at no additional facility cost presents all kinds of ininguing possibilities - from video to host-to-host - for voice and data communications managers to contemplate .

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## Learning to keep time on a network

In the design of any digital network, one of the most important considerations is that of network timing. The interconnection of ans two digital network compo nents requires some timing refrence to ensure that bits move accurately across the interface.

A number of techniques are used to see that devices montain synchronization, that is, operate at the same but rate. In a syn chronous data communications interface using RS-232, for ex ample, synchronization between a terminal (data terminal equip ment, or DTEI and a modern idana communications equipment or DCE) is must used by using a strobing signal carried as

Either device is capable of viding the timing reference and the transmitted bits pass across the interface in conjuncpon with that timing reference - one bit for each pulse on the strobing signal.

The use of a separate electri cal circuit to provide a timing ref erence is impractical in longe distance digital transmission sys ems, so a different mechanism a used to DS1-rate (1.544N the turney is carried within the signal itself a technique called sochronous timing

The physical interface for a DS1-rate facility is made up of wires altogether, two ni which are used for the transmit ugnal and the other two for the receive signal

achty - multiplexer, channel nk or private branch exchange - derives the timing by isidening the frequency with which the bits appear in the reerved signal. The transmission nterface recurres sufficient one uts in the signal to ensure that he timing can be maintained That requirement is termed ones-denuts

#### istence is operated by AT&T be problem with timing digital Communications. We can use ransmission networks is that a have to be interconnected to the ame network and made to oper the in considering with the same

gater timing source dure or checklist exists that an he used to make sure the no flow bas based or reliq parami rate despite component outage hat is required is a basic under tanding of the principles inalved and the options available molement the synchroniza

n - president of dilen Nove eten la, and renducts the Bosons investors access Reserve Seminar on

As bits pass between devices n a digital network, steps must be taken to ensure the transmit ter sends a be at the same time the receiver expects to receive one. If the devices send and recause at assen shabile different rates, transmission errors even-

tustly occur. Sight timing differences crop up if different devices are a wed to transmit using only their own internal timing sources with no means of main taining synchronization between This clock operation is called "freewheeling." The yaration in timing is due to the timing circuits' limited sophisticaion, which is based on what can be cost-effectively built into net-

**Buffers to treat symptoms** Ruffers can be used to compen sate for timing differences, but if a difference is significant or a timing source drifts too far, the buffers will eventually run full or

When a buffer nine out of ca posity, a function is iniplemented that causes the contents to be discarded - that is it takes the bits in the buffer and throws them away. This will not drastially affect voice channels using 64K bitiser. Palse Code Modula tion encoding, but it will definite ly affect data transmissions in which every let has meaning Data error, introduced when the buffer is emptied will have to be corrected by the data link proto-

li all network devices were ade to operate at the identical bet rate bets would not accumulate to fill up the buffers, and compensate for timing variations. That is the end goal of net-

#### A synchronization model The most mature digital trans-

that digital transmission network as a model for how synchronization plans can be imple In AT&T's network, hun dreds of digital switching offices

can be interconnected with digi tal trunking facilities, all of which most be synchronized to the same timing source. While each switching machine possesses its own internal timing source, it would be impractical to designate any one switch as the mas ter tining source for the entire priwork

What AT&T chose to do is to operate on a very precise timing source, an atomic clock, in Hillsboro, Mo., and then subordinate all the switching system clocks to that common reference. The timing reference produced in Hillsboro is called the Basic Synchromantum Reference Frenuency (BSRF), and it is fed to every digital switching office in the AT&T network for example

Number 4 Electrons Switching System offices, and to each local telephone company's digital switching offices, for example the Number 5 Electronic Switching System and DMS100 offices There are two methods used

to relay BSRF timing through the network Major locations can receive the signal from an analog nucrowave network empnating

Stratum I refers to the atoms clock located in Hillshorn Net work switches operate at either

assigning each to a category

called a Stratum

typung is traced to the BRSE Keeping in step Most users cannot afford to maintain atomic clocks. Even if

Stratum II or Stratum III accuracv AT&T's Technical Refer ence 60110 describes the plan and defines the accuracy at each Stratum However, even d'a de vice possesses a Stratum III internal clock, it will normally onerate at Stratum Lacroracy of its

customer's device must provide buffering to compensate for any difference between the two can ners' master clocks. The buffers should be sized for the worst posthey did, they might still have to sible timing variance that could interface to facilities in a carrier network that were ned to the clocks, based on the timing accoracy of the point where the cus-

tomer accesses the carrier's net-This buffering process is usually easier said than done. Vendor support for synchronization planning has not progressed at the same rate as customers' re-

access to AT&T's Megacom service. Normally, one user device, such as a PBX nr a mi plexer, is slaved to an AT&T timed service, and that device is then used as a master timing source on communications chan-

nels to other customer network

The synchronization issue be-

nmes more complex if the cus-

tomer is using digital channels

from a number of carriers that do

reference. For example, MCI

Communication Corp.'s network

timing is provided by Loran C. at

atomic clocking source main-

ranged by the LLS possernment not the BSRF. In that case, the

not use the same master tin

There is nothing mystica about network synchronization it as merely one of the basic In the AT&T network, that rafts in digital network design clock source to the BSRF, and As the network grows larger and the user must synchronize his more devices are connected to it. clock to that clock source if he is the synchronization plan beconnected by a digital transmisson faribty to either a digital but the same techniques are al-

As time goes on, vendors and ers of telecommunications will develop these skills. For now though, we operate in "learn as ment might be a DS1-rate trunk you go" mode. .

#### SYNCHRONIZATION between offices does not always cause data errors. With luck, everything continues to work perfectly. It is not advisable, however, to depend too heavily on luck in a network design.

carrier's clock source.

Connect Systems link

notwork switch or to a diental ross-connect system like the

AT&T Digetal Access Cross-

An example of that require-

from Hillsborn. If an office does not receive the timing signal di rectly, the timing can be carried on a digital transmission facility on a connected office If the timing is received from a communications facility, the office receiving the timing will use

a phase-locked loop types recovery process that locks all of as timing devices to the frequen cy of the bits being received. All bets transmitted from that office will then be sent based on that same frequency, which is trace able to the BSRF The clock with each office usually connected to more than one source for the turing.

Along with the basic distribu tion plan, there are also backup plans. In the event that an office loses the transmission link that provides its timing reference that office will immediately look to its defend backen. If all of its backups fail, that office begins to use its own internal timing source - freewheeling, or oper independently BSRF. In that case, the office that is freewheeling is more likely to experience errors on a

an office that is linked in the Asynchronization two offices does not always cause data errors. With luck, ey erything continues to work perfectly. It is not advisable, howev-

er, to depend too heavily on luck in a network design AT&T also defines the acru racy of the clocking sources used in various switching offices by

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DIAL JIND READER SERVICE NUMBER IN

## VENDOR VIEWPOINT More muscle needed to support new uses

BY WILLIAM A. FLANAGAN T1 networking is stimulating a great deal

of activity right now. Is it all mere hoopla. or will this commotion eventually lead to something? Does anybody really need 80, 90 or 100 T1 lines in a single node? Or is it a case of "My dog is better than your Emerging user applications and accepted carrier services will eventually de-

cide the noint. Already, they seem to be indicating a trend toward escalation in sue and sophistication of customer-prem-Large nodes will offer more T1 knes. iroughput and more voice/data I/O ports. In some hubbing situations, a T1 node with 100 links and 2,000 ports makes sense. Not every company needs

need more than one or two nodes of that Figuragin to sensor manager at Timestex. In. in Woodclaff Lake N.J. Before he joined Timeples. he electing firm weeked on introducing Datapi Il service. He is the author of a recent book. The Telecomment Guide to Ti Networking (Telecom

nect Library, 1986)

hondred towatsons. But the option is more to have if you hone to grow your network along a relatively easy migration path. Actually, the 'opt

for growth is hardly an option at all. Consider the nications

· Networks never get smaller Networks never get slower . Networks never stay the same

Bandwidth needs will grow at a rapid pace. Computer-aided design and manu facturing, graphics, teleconferencing and other visual transactions, beyond the desuch capacity, though, and fewer still mands of voice, eat up huge chunks of handwidth. Annications that have graph. ics on-line will raise the bandwidth rerement for terminal support by an or der of magnitude from that for text-based terminals. Where analog lines were once

sufficient, T1 lines will be needed. Where one T1 line is used now, many will be re-

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vices makes advertising your re

As T1 lines multiply, communications managers will notice that taruffs for digital transmission favor T3 to replace as few as five T1 lines. Suddenly, there are 28 T1s to terminate. The larger T1 nodes will come in handy: today's T3 multiplexers are relatively simple, point-to-point de-

vices without switching functions Cheaper bandwidth will make applica tions economical that previously were

> AT&T's Digital Access Cross-Connect Systems (DACS) compatibility on the T1 link will be neces sary but not sufficient for market viability. Compati bility will be necessary be cause DS0 channelization will dominate the carrier

offerings for voice and

To get the new sophis ticated services, end users will need compatible customer-premise equipment. At present, this is the D3/D4 format with standard Superframing. The D5 channel bank format, with the extra diagnostic ability of the Extended Superframe (ESF), formerly known as Framing Extended, will gradually replace D4 or Su-

perframe Custom er-premise equipment

On the other nd. proprietary formats make most efficient use of a T1 data link. By ignor ing the 64K bit-(sec. boundaries of

flexible formats pack more connections mice as well as data - into the available bandwidth. Would you rather have 96 or 150 channels at 9 6K bit/sec, in your T1? Eliminating waste still means something for transcontinental T1 lines exenatter tanff reductions

Note that both formats provide and ic. will be used in the same network The relative balance will fall somewhere between two extremes: ost all private format on leased lines

with a few gateways into public networks for backup and disaster recovery · Almost all public for example a soft ware defined service network, with one or a few high-density corridors on leased or

Either of these, and everything in be tween, is a hybrid network. A hybrid will be the solution of choice in most large cor porations, so T1 nodes must support both samultaneously Keep in mind, though that proprietary

formats (those not divided into 24 chan nels) must be framed in Superframe or ESF to be carried by AT&T and some other carriers. In other words, propri etary formats must have the proper but pattern in every 193rd position

Voice compression is a corollary to cornetary framing. The standard technonae today - 32K bet/sec. Adaptive Differential Pulse Code Modulation - 25 specified by the American National Standards Institute and the Consultative Com nttee on International Telephony and Telegraphy - still possesses some re-dundancy. Theoretically, toll-quality voice needs less than 16K bit/sec. Getting down there in the next few years is going to be a race however. Encoding standards will take at least that long to settle

On top of encoding to get 2-to-1 or 4 to-1 compression, the clever T1 network will apply digital speech interpolation. By taking advantage of the pauses in normal conversation, special equipment options will statistically multiplex voice for an additional compression of 246-1 or more Compared with Polse Code Modulation, a Ompression of up to 10-to-1 seems possi

Customer-controlled reconfiguration will migrate, probably in many little steps to Integrated Services Digital Network (ISDN). The controlling factor will be the speed with which the carriers install digital central offices and digital loop equit

End-office central offices in the U.S. relied mostly on analog switches until as late as 1983. While many of those switches enoved stored-program control they were "computerzed" - the switching matrix itself was analog

In the last two years, a global stampede has raced to replace this type of analog machine with digital switches. Canada's central offices are almost entirely digital new, having converted in the last wo years. The UK and most European countries are in the midst of complete overhauls. The U.S. lags, in part because

HERE analog lines

T1 lines will be

used now, many will be

required.

hancements to analog switches offer most of the feawere once sufficient. tures of digital devices Such add-ons even provide for needed. Where one T1 line is data handling Fu ture ISDN networks. however

will require digital Switches 1350 meantime, keep an eye out for DACS and similar products to appear as customer equipment not sust in the central

Voice and data integration will not be omplete in customer-premise equipment for some years to come Vince private branch exchanges (PBX) can handle data but at a higher price than data-oriented switches. There is also a question of availability. If voice and data are in the same basket and the basket breaks, do you think you will really want to eat that many

- rembled ceas The T1 resource manager or network and the ability to find alternate routes for failed cunnections lacking in most PBXs. Separate administrators for voice and data will also tend to keep the switching functions apart, while the corporate infor mation officer will demand their integra-

tion for transmission economis

ed inside the T1 "multiplexer" until it has been necessary to find a new name for this class of device to distinguish it from a common time-division multiplexer or

Today, the network exchange or reurce manager, is a node of many functions. It not only will multiplex almost any kend of digetal information, but it will auto matically find alternate routes around failures, cross-connect DS0s bypass or drop/insert any standard hit-rate channel. allocate bandwidth on demand offer test access and function as a matrix switch of arrous standard data rates

The evolution is probably still far from compelete. Communications needs promuse to propel the high end of the market everfurther a



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## Going beyond T1 speeds to DS2, DS3 and higher

T1 ranks low on the digital transmission hierarchy

While most of the current activity in diantal private networks centers on 1.544M bit/sec. channels, that rate actually represents only the lowest speed digital transmission facility used in a common carrier's network

In a carmer's transmission network, beat a focal-exchange carrier or an interexchange carner, 1.544M bit/sec. signals

are carried on reneatered ware, our facility ties. That is the real meaning of a T1 Car-

Higher capacity transmission systems such as digital radio, digital coassal and fi otic systems can carry many times that 1.544M bit/sec. rate, and, consequently, a number of 1.544M ht/sec channels are multiplexed to form the

higher bit streams that drive those trans-

In order to econderdose on one set of multiplexers, and thereby reduce the cost of the network. AT&T Bell Laboratones developed a standard hierarchy of digital transmission rates for use in the AT&T network. That hierarchy is also used to structure local telephone company trans mission systems and other common carnor networks. An understanding of this structure allows a network planner to recognize potential difficulties that may oc-

cur in digital networks and to anticipate digital services that carriers are able to ode most readily The digital network hierarchy defines

a number of signal rates, each of which is designated as Digital Signal (DS), fol-

The 1.544M bit/sec, data rate of the T1 Carner Systems is the basic building block of the hierarchy and is termed DS1 The real T1 Carrier System operates only on wore-ner transmission facilities, while DS1-rate channels can be carried on any ussion medium. When describing one of the 64K bit/sec. digital channels carried in a DS1, those channels are re-

Stacking signals

In the multiplexer hierarchy, four DS1 signals are multiplexed to form a DS2 sigwhich operates at 6.312M bit/sec and carries 96 DS0 channels. There is a wire-pair carrier system called the T2 that operates at this rate, but its use is

The problem with the T2 carrier is that it requires special low-capacitance cable and will not operate on the standard plastic-insulated cable used for T1 carrier

A third wire-pair carrier system called the T1C was also developed. This carr. system operates at a speed of 3.152M bit/

ELEPHONE companies and longdistance carriers have been trying to minimize the digital signal rates they use in order to limit the amount of test equipment and testing points in the network

sec and carmes 48 DS0s. The 3.152M bit/sec, rate is termed a DS1C, but few

Seven DS2 signals are further multi-

plexed to form a DS3 signal, which operates at a speed of 44,736M bit/sec, and carnes 28 DS1 signals for a total of 672 DS0 channels. (Twenty-four DS0s in each multiplied by 28 DS1s equals 672.) The DS3 rate is the standard electrical interface rate for all high-speed digital facilities. For example, a 139M bit/sec. fiber transmission system can carry three DS3 channels. The 139M bit/sec, fiber term nal would bouse three DS3 electrical interfaces.

A number of carners, including AT&T ammunications, are currently offering DS3-rate private-line services. A smaller number of carriers also offer a DS2-rate

A DS4 signal was also defined. This sumal is made up of six DS3-rate channels and operates at a speed of 274.176M but/ sec. The DS4 suppl could be carried on coaxal facilities, but the carners have all but stopped building coaxeal cable systems, and the DS4 signal rate is beginning to look like an anachronism.

Telephone companies and long-distance

carners have been trong to minimize the number of digital signal rates they use in order to limit the amount of test equipment and testing points in the network, and they have been standarduang on DSI and DS3 rates Eventually, the standards hierarchy

will have to be extended to standardize on higher rates, but at this time, standards



OTLIGH

are defined only to DS3. Each transmisuon system manufacturer accepts utputs at DS3 and then uses a propriet ary format to multiplex to higher rates. Obviously the higher speed channel must also be demultiplexed to the DS3 level in that same manufacturer's equipment in order to al

w connection to other vendors' devices.

AT&T publishes the "Digital Multixes Requirements and Objectives Bell System Technical Reference PUB 43802, but the multiplexers themselves are available from a number of suppliers. including AT&T Network Systems. Northern Telecom, Inc. and Rockwell-Wescom, Inc. While some multiplexers do go from DS1 to DS2 rates and from DS2 to DS3, called M12 and M23 multiplexers, respectively, the most popular kind the M13 multiplexer, multiplexes 28 DS1 hannels in DS3. An M13 multicosts in the range of \$10,000 to \$15,000

The DS1 signal is byte-level multiplexed: eight bits from each of the 24 channels are multiplexed into a frame that includes a

NE of the major problems carriers face with the current DS3 format is that it makes for additional expense in configuring a network.

framms but. The multiplex format above DS1 calls for bit-level multiplexing. To generate DS2 and DS3 suggals, additional framing and stuffing bits are added, which accounts for the differences between the input and output signal rates (1.544M bit) ec. multiplied by four does not, for in stance, equal 6.312M bit/sec.)

The framing bits are used to identify and demultiplex the signal, and the stuff ing bits compensate for timing differences that may occur among the various network components.

Also, the signal cannot be multiplexed directly from DS1 to DS3. Even though the multiplexer might take 28 DS1 inputs and produce one DS3 output, four DS1s are used internally to produce a DS2, and the seven DS2s are then multiplexed into

#### ating a step

One of the major problems carriers face with the current DS3 format is that it makes for additional expense in configur-

Given the way the channels are multiplexed it is impossible to build a simple. logic circuit that could monitor the composite DS3 surnal and extract any one of the DS1's. The interface to digital switching systems is always at the DS1 level, so the entire DS3 signal must be demulti plexed to the DS1 level in order for channels to be interconnected. For a telephone company, this means a lot of M13 multiplex gear and a set of wire jumpers that would constitute an electrician's

Recognizing this problem, Bell Comunications Research Corp. defined a new plan for generating a synchronous DS3 ugnal. This plan is called Syntran The advantage of the Syntran signal is that it allows the telephone company to drop or insert DS1 signals without having to demultiplex the entire signal. At this time. little equipment exists that can generate Syntran defined DS3 signals, but that is the next likely step in the migra-

A solid understanding of the carrier's network configuration can help a telecommunications planner determine what services the carrier is likely to offer. Further, as more user organizations begin to use DS3 as well as DS1 transmission facilities, they, too, will have to face the same network configuration decisions as the

telephone companies. It is hoped that by then the technical foundations will be laid and end users will be able to profit from the experience of the common carriers. •

Digital multiplex hierarchy

Digital Signal	But Rate*	DS0 Channels	DS1 Chemnels	Medua Used
0	.064	1	1/24	Wire pair
1	1.544	24	1 .	Wire pair
1C	3.152	48	2	Wire pair
2	6.312	96	4	Low-capacity cable
3	44.736	672	28	Digital radio fiber
4	274,176	4.032	168	Coaxial cable

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## Doors open for channel access testers

As a result of the rapid growth in both public and private networks, the market for digital-transmission test equipment is expanding quickly. T1 channel access test equipment is a good example of this family of products. It also exhibits one of the highest growth potentials

Channel access test equipment can ac-Chow is president at Able Communications a Mil page Calif. telecommunications market nevers hi

cess any one of the 24 individual 64K bit. sec, channels on a T1 line. Its monitoring features include channel access decoding. error-performance monitoring and integ rity checking. Transmission test capabil ties include local and remote loop-back and be pattern synthesis. The base price ranges from \$2,000 to \$7,000 and, with

ons from \$3,000 to \$15,000. Each of these units is transportable surcase-size or smaller. Less than 50% offer loop-back capabilities. Remote con trol allows the loop-back on one channel

access tester to be operated by the controls on another. This is accomplished by loop-up and loop-down codes embedded in

the digital bit stream Approximately half of the channel access test enument available offers software configurability. Software configurability provides for control of the channel access test unit via a terminal console connected to or built-in to the device it-Tests and measurements are run software programs rather than with

built-in knobs and switches.

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Although only a few of the units currently offer Extended Superframe testing capability (CRC-6 and so on), most ven-

dors indicate they plan to incorporate it. About half of the channel access test equipment features bit-error rate, built-in atter and A and B signaling tests. The othor half provides access for additional

equipment to perform these tests. The demand for T1 carrier services will continue unabated through 1988. The telephone companies and common carriers will be the first to experience overcapacity of T1 channel access test equipment, but not until 1990 or later. Meanwhile, demand from end users first large corporations, then smaller companies - will eventually exceed telephone company buying as end users real-

ize the need for drop-and-insert testing equipment. The need for channel access test comment's featuring both voice and data measurement already exists. Increased complexity of the equipment and the drive to all-digital testers is now breeding the personal computer-based test unit. As a result, the once of test units should increase significantly during the next few

The total market for Tl channel access test equipment in 1986 was estimated to have been \$25 milion. Its growth rate mitially projected at 40% - increases to 60% as end-user orders increase and more complex software-driven units bearing higher price tags enter the market. The burgeoning demand for T1 transmission lines will continue to feel the

growth for the T1 test equipment industry overall Total dollar sales of T) channel acc test equipment increased 40% from 1986 to 1987 and should increase 60% through 1988. This growth pattern reflects the sum facilities and sufficiently sophistical eduse to warrant the nurchase of related

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TCAT 241 · Hekimian Laboratories, Inc. 3705 Hekimsan 3962 . Hewlett-Packard Co. 3776A/B

 HP3779C/D • LP Com TC-2000 Phoenix Microsystems, Inc. 5148

· Sage Instrument 930A

• Sierra 4017

 T-COM 220A & 515A T-COM 320A & 515A Tekelec 820A

 Venator Systems Vencat-24 . Venator Systems Vencat-1A · Wandel & Goltermann, Inc. PCD-

2 PCC-2 · Wilcom Products, Inc. T308-01A GEORGE CHOW

## T1 multiplexers

COMPANY	MODUCE	MAXIMUM DATA CHANNELS SUPPORTED	POINT-TO-POINT OR MUTIPOINT	BANDWIDTH REQUIREMENT FOR OVERHEAD	ASYNCHRONOUS DATA CAPABILITY	ASYNCHRONOUS SPEED	SYNCHRONOUS SPEED	SIT INTERLEAVED OR SITE INTERLEAVED	FRAMING STRUCTURE	INTERFACES SUPPORTED	VOICE CAPABILITY	VOICE-COMPRESSION METHOD	DROP AND INSTRE	NETWORK CONTROL	REMOTE MULTIPLEXER DOWNLOAD CAPABILITY	AUTOMATIC RESOUTING CAPABILITY	Disk	DIAL-INO READER
ble Computer 143979-7030	T1 Marter	VA.	Print to-posit	25%	No	NA.	1M brilsec	Bec	D4. Extended Superframe	RS-422.NRZI	So	24	6	50	8	V	Circan	\$90
EG Bayly, Inc	Changleser	288	Valipon	13+	Yes	75 to 19 2K	Lyto 568.	\$4.50	-14	V 35 RS-232 RS	10-	PLM MIR M		'	1	71	\$5,000	4)
Emdahl Communications Systems Decision 214 (899-850)	Multistac 31 T1 Multiplexer	92	Prox-to-point	29.	Yes	110 to 19 2K bt/sec	9.6K to 2.048M bit/sec	Bet	Optional D4	V 35, RS-232C V 24 MIL 188- 114 Bel 301 RS- 422 RTZ Rer- opts:	Yes	ADPCM AECVS01	60	he-	bet.	Se	\$7 000 \$15 000	912
	Mulantar III T I Mulapieser	92	Multiposs	20	Yes	110 to 19 2K bt/sec:	1 544M to 2 048M brisec	Biese	D4 optional Extended Superframe	V 35 RS-2320 V 24 MHL 188- 114 Bel 313 RS- 422 RTZ, filer opts:	Yes.	ADIPCM AECV SD	Yes	hes	Ye.	<b>\</b>	\$9.000 \$25.000	
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communications Lorp (01) 849-4660	Open Network Exchange	7 400	Multiports	1% or less	Yes	19 2K bn/sec	1 SK boser	Byte	D), D4. Extended Supertrame	V 35 RS-232 RS 490 X 21	Tes	ADPCM	Yes	Yes	Yes	Yes	\$100,000	926
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ydin Monsor Systems Inc	624KA 10	120	Post to-post	0%	<b>V</b> o	3.4	1 200 to 766K ht hen	Sir.	D4	3-25 R>222 RS-	1n	rige:		<b>V</b>	٧.	-	Contact London	4)"
Systems, Inc. 1151657 7450	6248A 20	120	Multiprint	04	<b>%</b> 0	NA	1 200 to Took bither	Berk	134	1 35 Rs 232 Rs 449 4 wer ESM	he-	1 QL	hr-	ìc-	ben	1/0	Legal Legal	
	6296	120	Post to-post	0.404	<b>%</b>	SA	1.200 to	tie	D4	3-35 R>-222	bes	NULTED:	Non	10-	· hr.	71	Code I	
sangs-Perkins 18: 655-2063	2248	ı.	Fount-to-point	N4	Yes	1 544M	TORK hither NA	Be:	DSI	TI	No	SA	Se	No.	No	Se	\$3 066	914
18: 858-2003	3124	192	Both	5%	Yes	br/sec Up to 29 2K	Uo to 512K	Ber	D4	V 35 RS-332 RS-	Yes	PCM	le-	Yes	Tes	10	\$4,500	-
oastcom (01433 3433	Stepnet	286	Beth	VI.	hei	britec Up to 39 2K bit sec	2 400 to 1 536M	Bite	E4	422, TCM Noor 1 35 FS 232 RS 449	bei	PCM UPCM	10	100	300	1	\$40,000 \$14,000 \$44,000	474
ndes Corp. 171364-2000	6240	96	Multipoer	10%	No.	NA	Up to 1 2M basser	Bet	D4	V 35 R54 R5-232 R5-449	Yes	PCM ADPCM	Yes	Yes	Tes.	Yes	\$20,000- \$63,000	920
manel, loc 00; 424 4451	DCP9100T1 Dsra/Voce Matspirser	96	Prent to-poert	94.	Tes	Cpto192K brises	Lipsy 1 536K bd (se.	Both	D4 Extended Superframe	V 35 R9732 R5	les	PCM ADPCM	54	10	h-	٠,-	\$4.000	6,1)
		960	Print to your	1.	Tes.	Lipta 19 2K bitisec	Upro I SSOR below	Bite.	Da Extended Supertrame	15	100	NA	300	100	300	10-	\$4,350	
gital emmunications mecution/Cohosive letwork Corp. 50: 370-4100	System 9000	144	Multiplex	0 40%	Yes	50 to 19.3K ht/sec	1,200 to 1,536M lst/tec	Byse	Dt. Exceeded Superframe	V 35 RS-232 RS- 422 IS-440	Yes	ADPCM	Yes	Yes	Yes	Yes	\$13.700 \$1.00 000	922

The commission included in this chart responded to a recent telephone survey conducted by Commission III Further product information is available from worders

COMPANY	PRODUCT	MAXIMUM DATA CHANNELS SUPPORTED	POINT-TO-POINT OR MULTIPOINT	BANDWIDTH REQUIREMENT FOR OVERHEAD	ASYNCHRONOUS DATA CAPABILITY	ASYNCHBONOUS SPEED	STNCHRONOUS SPEED	BIT INTERLEAVED OR BYTE INTERLEAVED	FRAMING STRUCTURE	INTERFACES SUPPORTED	VOICE CAPABILITY	VOICE-COMPRESSION METHOD	DBOP AND INSERT	NITWORK CONTROL SYSTEM	REMOTE MULTIPLEXER DOWNLOAD CAPABILITY	AUTOMATIC BEBOUTING CAPABILITY	PAICE	DIAL-ING BEADER
Dynatech Comproprientices, Inc. (401) 884-9075	intelest	288	Mukipunt	He	Ϋ́es	73 to 19 2K he/sec	2 400 to 1.536M bit/sec	Byte	D4 Extended Superframe	V.35, RS-232, MIL 188, RS-449, RS-422 MIL 188/114, DSO-DP OCUL DP	Yes	PCM, ADPCM VCPCMP	Yes	Yes	Tes	Yes	\$3,606- \$35,000	923
	finceloù Digesi Cross Connect	584	Multipent	Crts.	No	NA	1.544M to 2.048M bitlier	Byse	D4 Extended Superframe	RS-422. Ti	Yes	PCM. ADPCM, VEPCM	No	Yes	Yes	Yes	\$3,500- \$10,000	1
Emules Corp 114:662 5600	CS41	144	Post to post	(146	) to	50 to 19 2K by iso.	NA.	Bu	04	RS-232C/V 28 or RS-423 A/V 160L26	N <sub>0</sub>	NA.	Yes	No	Yes	NA.	85.500	924
Gendalf Decs, Inc. (312) 541 4060	GLM S28E	128	lka	0.50%	Yes	Up to 19 2K bit/wc	Up to 64% billiarc	Se	Proprietary	RS-232, V 24, 50- per J-type Telco currenctor	No	NA	Yes	No	No	No	\$3,475	925
General Datacomos. Inc 2021/974 1118	Megawerich	512	Bots	214	bex	75 to 19 2k bt sei	300 to 1 152M bit bes	Be	Proprietary (Autofrane)	RS-232 RS-622 CCITT V 10 V 11 V 24 V 35 MIL 188 CCITT G 703	Yes	PCM ADPCM CVSD ASP (Propertary	Yes	Ves	tes	Yes	\$20,000 \$200,000	926
	Megamus	54	Prior to gove		te	50 H19 HK 04 het	398 pt 1 024M Miller	Bir	Propriesan (Assifrance)	RS-232 RS-422 RS-423 CCITT V 10 V 11 V 24 V 35 MIL 148 CCITT G 763	tes	CLRD	No.	bes	No.	74	\$10 000 \$40 000	
	Vegano Pa	54	Port ro-gont	2×	bes	75 to 19 2K bet-ex	300 to 1 1 12M (bit set	No.	Proprietary (Autofrance)	85 232 R5-622 85-423 CCITT 9 10 V 11 V 24 V 35 MIL 188 CCITT G 761	Yes	PCM ADPCM CYSD ASP (Perpretary)		lin	tes	¥1	\$10 000 \$40 000	
Granger Associates (468) 727 3101	CP 2000	230	Both	14	Tes	1,200 to 19 6K bit/sec	1 200 to 1 536M be/sec	Bu	D4	V 35 R5-232 RS- 422 4-war ENM- type 1 , 2 , 3 - 4 5 - 2 ware FAS	Yes	ADPCM	Yes	Yes	No	No	\$25,000	927
Inhect lec	ITM 1536	184	Matriport 16 Tr	0.50%	'n	58 51 14 2k 58 50 1	1 200 to 1 5 96 M	Bite	B4 Extended Superframe	85 422	Yes	PCM ADPCM	Yes.	bo	hr-	te-	\$20 000 \$200 000	928
Infotron Systems Corp. 1809: 424-9400	Intoxpean 1500	128	Malkgoost	0.70%	Yes	50 to 19 2K (M/Sec	64K to 1 024K bither	Byte	D4. Extended Superframe Digital Access Cross-Connect Systems Link	V 35 PS 232 RS 422	Yes	PCM, ADPCM	Yes	Yes.	Yes	Yes	Comect rendor	909
letegrated Telecom Corp (214-214-100)	Acode-	74	Матрист	1+	Yes	1 pro192% berwe	2.400m 1.436M bitset	this	D4	V 55 T1 RS-232 RS-449	Yeu	UPLW	hr.	hes	Yr-	bo	\$30 100	430
Megaring Corp (516) 435-4666	CMX Tiseries Multiplexer	192	Best	0.50%	Yes	Epic 9 6K bether	SEK to SEK bit sec	flyse	De	V 35 RS-232 RS- 422		PCM	Yes	Yes	Yes	No	\$3 995	931
Micoria Systems. Inc 8001-602-6647	Ti Local Multiplexer	128	Serve		Ser	19.2km 9.8km	14	Bet	Lobremisted 10	85-202	No.	M	No.	No.	hr.	No.	\$1 600 \$12,600	972
Network Equipment Technologies, Inc (415) 366-6400	EDNX/70	400	Multipore	150%	Yes	1 200 to 19 2% balsec	1,200 to 1 344M busec	Be gro- ptet ary i	SOLD4	V 35, RS-232 R5- 449 RS-422	Yes	CEITT ADPCM DSI	Ten	Yes	Yes	Yes	Contact retider	933
	IDNX/40	66	Multipore	150%	Yes	1,200 to 19 2K betwee	1 200 to 1 344M bither	Bic Oper- oner-	D3/D4	R5-232, V 25 R5- 449 R5-422	Yes	CCITT ADPCM, ESI	Yes	Yes	Yes	Yes	Cretact vendor	
Setwork Switching Systems, Inc. nd?1470(20)1	2165wt h	131	Net to pure rand relie esk	41	hi-	1 200 to 19 7 <b>A</b> Million	2.4000± 269K birnes	Er.	D4 Eurodre Superframe	V 35 RN 232 4 New ENM	Yes	ADPLM	le.	Yes	le.	le-	\$70,090 \$150,000	938
Sentendge Serworks for 7030 834 3600	3600 Variables Bandwidth Manager	144	Multiport	350*	Ϋ́ο	Up to 19 2K bitiser	1 544M to 2 048M betser	Byte	D4	V 35 1 Sloopstart groundstart trusk X 21 direct connect card T1 CEPT	Yes	ADPCM VQC*	Yes	Yes	Yes	Yes	\$10 000 \$30 000	935
Paradyne Corp #1 C 5 1 1 222	3219	do	Brit	0.59+	lo	600 s - 38 4K bit set	2 400 to 1 336M	Bach	Superframe Extended Superframe	RS-232 V 59 RS-	Yes	PCM ADPCM (ASD	Yes	Yes	le-	h.	\$10 een \$30 een	936
Numerous Division/ Blubbell Inc 8001441 1005	PD4 T1 Multiplexer	48	Port to-post	0=	Vo.	NA.	2 400 to 648. bet/sec	Betc	D3, D4 Extended Superframe	V 35 R5-232 RS 449.	Yes	ADPCM	No.	No .	No	*1	Contact vendor	937
CAD Bata Commons atoms Inc	Megapies 1	7	R is to purp	16		VI.	SERVICES OF SERVICES	Ви	Pigral Acres Lines Contect Marketts compatible	V 35 RN 422 CNL Linno Linting I	Yes	ADPCM	Ye.	V-	Ye	٧.	\$4.900	9,94
Raycom Systems, Inc 382:130-1620		110	Post to parte		Yes	Up to 19.2K beliec	1 St4M blower	20-1	NA.	V 35, RS-232 RS- 622 IBM 3276	No	NA.	Yes	No.	No.		\$2,500 \$10,000	939
CHEC Longregues albana Systems 1911 A&A 27 + 1	H-P11		Perel pere		he-	515 [4.8k 50 us	Strait 344M brows	(k)	Di	V.35 RV-449 Ro- 2/2 RV-422 RS 4/3	Ye	CVSD	V-1	16	tes	٠.	\$6.100	940
pectrum Digital Corp 103: 478-0560	INDA	5104	Netper	U-80*	Yes.	50 to 19 2K bit set	2 400 to 2M brises	Su	DS/D4 Extended Superframe	V 35 RS-222 DSX1 CCITT G 203 V 28 V 28 RS-449 RS-422	Yes	ADPCM ASI**	Yes	tes	Yes	be-	\$15 000- \$100 000	941
tratación loc from 170 / 151	Pours Pours Exitation	91	Witness		le-	lord*/&	ListA	***	D4		lei	YDECM IPI	)e:	10	he-	hr.	\$15 000 \$500 000	942
Day Teve. Inc	Isteaplex	104	6.0	0.50m	No.	Late 192%		Byte		V 35 RS-232 RS-		FCM	Yo.	No.	No	30	\$3.75%	547

COMPANY	PRODUCT	MAXIMUM DATA CHANNELS SUPPORTED	POINT-TO-POINT OR MALTIFORNT	RANDWIDTH REQUIREMENT FOR OVERHEAD	ASYNCHRONOUS	ASTNCHRONOUS SPEED	SYNCHEONOUS SPEED	RIT INTERLEAVED ORBYTE INTERLEAVED	FRAMING STRUCTURE	INTERFACES SUPPORTED	VOICE CAPABILITY	VOICE COMPRESSION METHOD	DROP AND INSERT	NETWORK CONTROL	REMOTE MULTIPLEXER DOWNLOAD CAPABILITY	AUTOMATIC REPOUTING CAPABILITY	PRICE	DIAL INGREADER
Tellabs, lac 1322) 169-8800	Crisciet System	1.28	Both	16	Yes	30015 19 290 bujaec.	1,200 to 1,31 M between	Đe:	Extended Superframe	V 38, FS-237C EIA RS-422, RS- 423, MIZ. 186- 114, 4-wre ENM, 2-wer FXS/FXO, DX, NSF, DSI-T1 Baptis AMI or BAES, T1 Bipoise AMI BRES CCTTT V 35	le.	ADPCM	Yes	Yes	Tes.	Ve.	\$14.150- 891,306	944
Teltone Corp. 1801 426-3926 Timeplex. Inc. (201) 930-4600	38 925 multiple Timpples Link/2 Dista/York Nerwork Exchange		Poet to poet Multipoet	1% or less	le le	Up to 9 6k believ. Up to 19 2K believ	50 to 1 152K bit/sec	tie: Bysa	DSELIDA	RS-232 V 24 RS- 422 V 11, RS- 423 V 10, V 35 MIL standard 188- 114 DSS1 CCFTT G-703		PCN ADPCM, CVSD Last Packeture Voca Server	Yes	Yes	Yes	Tes.	\$12,865	545 54E
	Timeplex Ministra/2 Data/Foxe Network Exchange	24	Multiporti	1% or less	Yes	Up to 19 2K billion	50 to 1 152K bit/sec	Byte	DEXI/DA	RS-232 V 24 RS- 422 V 11 RS- 423 V 10 V 35, MIL standard 188- 114, DSX1, CCTTT G-703		PCM. ADPCM CVSD Link Packetured Vace Server	Yes	Yes	Yes	ten	\$9.235	
	Timeplex Link/T T1 Facation Management System		Multiport	1% or less		Up to 19.2K betjuer	bat/sec			RS-232, V 24, RS- 422, V 11, RS- 423, V 10, V 35, MIL standard 186- 114, DSX1, CCTTT G-783		PCM, ADPCM, CVSD Leak Packetseri Wace Server		Ter	Yes		\$12,156	
	Timples Medica/LTI Facilities Management System	24	Multiport	1% or less	Yes	Up to 19 2K becker	SO to 1 (SSK be/her;	Dyne	DEET/D4	R5-232, V 24, R5- 422, V 11 R5- 423, V 10 V 35 MIL standard 188- 114, DSS1, CCTTT G-765		PCM. ADPCM, CVSD Less Pacturesed Vacz Serves	Yes	Yes	1m	Yes	\$9.450	

#### Selected statistical multiplexer vendors

#### Case Communications, Inc. (301) 290-7710

#### neveso

cessor integrates data concentra-tion and data switching for up to 64 000 network ports and 256 contention groups. It supports data rates of up to 9 6K bit/sec , with up composite links transmitting to 72K bit/sec. Features include short-form addressing auto rerouting and automatic reporting of significant systems events Price \$22,500 \$65,000

cessor operates as an asynchronous plexer with 240 asynchronous and 60 synchronous channels transmi ting on 15 composite links. Its system test and configuration module allows the network operator to logi-cally connect any multiplexer port on the network to any other. Mode lar design allows easy upgrade to the DCX850

#### rice \$12,500 -\$25,000

The DCX836 communications pro essor provides portt-to-point tistical multiplexing for up to 60 asynchronous or 30 synchronous channels with operating speeds ranging from 75 to 9.6K bit/sec. It provides compacted and accurate on a single composite link up to 72K bit/ses Price \$6,000 - \$22,000

bit/sec and synchronous inputs from 1,200 to 9 6K bit/sec. Price \$3,500-\$7,000 DCX812 The DCX812 is a four- to eight channel multiplexer. The chann support up to 9 6K bit/sec , while

The DCX842 multiple ,er is a feed-er multiplexer for other Case DCX

products. It can link any four multi-

plexers to a DCX840 or 850 com

musications processor through a gle composite line running at up

to 64K betwee Fach of the four at tached multiplexers support up to 64 vertial channels

Price \$2,350 - \$2,750

works, enabling users to me

and a single composite and to a

The DCX825 statistical multiplex

with onward linking capacity,

er offers point-to-point multiplexing

which allows remote multiplexers to transmit through a mid-point

DCX825 The DCX825 supports up

eight synchronous channels trans

mitted on a single composite link

up to 19.2K bit/sec. It accepts as chronous signals from 75 to 9.6K

tions processor. Price \$3,250 - \$8,100

DCY#22

the composite link can operate up to 19.2K bit/sec. It offers diagnostic capability that isolates failures at lo Price \$1.495 -\$1.895

#### DCX812M The DCX812M has all the features of the DCX812 but incorporates a

ase 4000-series diagnostic mo dem card, providing speeds of 9 6kg bit/sec and 14 4K bit/sec Price \$3.190-\$4.960

#### Codex Corp. (617) 364-2000

Codex 6015 The Codex 6015 intelligent net-The DCX833 statistical multiplex er feeds both synchronous and asyn chronous devices into DCX network processor provides data con contration for up to 16 terminals in point-to-cons and Codex 6700-senes (high-end nodal processors) gle network. It can be configured with up to 12 asynchronous deices, one Case protocol link moduli tention The multiprotocol software option allows support of 14 widely Case DCX840 or 850 communica-

#### Codex INP 6003 The Codex INP 6003 is a point-to-

point statistical multiplexer support ing four to eight asynchronous tercontrolled interfaces one an asynchronous nondedicated termithronous devices and, the second a frost panel 32-char LCD with membrane switches Price \$1,250-\$1,300

Codex 6740 DCP The Codex 6740 DCP delivery fer minal ports that support interfaces for a mix of asynchronous, systous and bit-oriented protocols Codex 6740 nodes support up to eight high speed composite links ranging from 2,400 to 64K bit/sec Price \$6,000

#### Comdesign, Inc. (805) 964-9853

The TC-500A statistical multiples vices on our communications link It features channel speeds to 9 6K bit/sec front-panel or executive port configurability, flow control and

TS-GOO

#### The TS-600 switching multiplexer offers the features of TG 500 A plus switching, port contention and synchronous protocol support. It offers an optional X 21 bis interface.

er gund-link version provides cost effective multisite connectivity supports right to 32 channels. The angle-link version supports four to 32 channels. It is compatible with the full line of the company's Fu-

## networking products Price \$2.100

plener is a quad-link multiplener that provides connectivity between multiple remote sites. It supports eight to 32 channels and includes switching, port consention and route-through It is Future cor

#### S-2000

The LS-2000 local multiplexer

ny up to 32 deer devices or CPU ports, providing high-speed local channel switching, ports only tion multilexel security route

tweet local or remote devices and Englal Equipment Lorp VAX-Unitus CPUs, it is available with an 802 3 interface or four RS-232C

#### Digital Communications Associates, Inc. (404) 442-1000

#### DCA Senes 100

channel capacities from eight to 32 Price \$1 495

#### DCA Series 200 The IKA Series 2000 products are

engle hex-beight modules that plug into the small peripheral controller slots of Digital Equipment Corp & Unibus computers. It supports two 19 2K bit/sec trunk> and emulates up to 16 DZ 11s or DMF 32s. Kes features include up to 128 as inchri nous parts, character compression sole configuration

#### DCA Senes 300

he DCA Series 300 is a family of network nervescors for private networks, offering a vafunctions — switching, routing, por contention, statustical multiplexing, prof version and network management with an architecture allowing virtually unlimit sobiaty in configuration. It has a busspeed of 4 27M bit/sec Prior \$6.495

### Gandalf Technologies, Inc.

The PIN 9103 is a stand-alone unit that ac The PEN 9100 is a stand-asone unit that ac commodates four or eight channels, a rack-mount configuration for up to 32 channels, an input rate of up to 76 8K biclises, and asyn-chronous channel rates of up to 9.6K bit/sec Interfaces supported are RS-232C and V 24 V 28 compatibles. The PIN 9103 also supports a composite link operation to 19 2K balisec with full X-25-level 2HDLC error detection and recovery and is suitable for operation on single-hop satellite links. Price \$1,550 -\$4,650

Price \$825 - \$1.085

PIN 9106 The PIN 9106 is an asynchronous statistical multiplexer with two asynchronous channel operating at up to 9 6K be/sec or four at up to 4 MK bittee: Peatures include error corre ste channels operating at up to 19.2K bit/sec menu-driven parameter selection, hardware and software flow controls and indicators, local and remote loopback, downline loading of pa rameters and echopies, autobod or fixed speed, battery backup and built-in Fix Re search line test nattern. The system sign res

#### Switchmux

nux integrates statistical multiple: me with data switching to offer line savings orrection and data networking fie belty for up to 16 attached subscribers per node. Features include high-speed-subscrib-er data transfer over a 64K bit live, composite ink, dual composte links for automatic fall-back and load balancing, and activity log and Fox Research, Inc. message generator from Proce \$2.650 . \$3.850

SP

#### General Datacomm, Inc. (203) 574-1118

The Gen-Net 1261 is a poett-to-point status tical multiplexer. It supports four or eight mous channels operating at speeds up to 9.6K brt/sec. Features include dynamic buffering, downline leading of configurations oplex, advanced diagnostics and per Proce Contact wand

#### Gen-Net 1262 The Gen-Net 1262 supports up to 96 chan

nels including any combination of asynchro-nous and boyychronous data formats and has a throughput of up to 256K bit/sec. It features channel priority on individual channels, open ator password security and an ASCII terminal interface to its internal control logic

#### Gen-Net 1264

The Gen-Net 1264 is an intelligent, asynthronous channel-swatching multiple ser. It as ottmodates up to 96 chantels and four high peed composites. Virtual circuits permit speed composites. Virtual circuits permit unrestricted channel routing across the net-work. Both models, the Basic and Enhanced

1264, allow channel and link configuration toning, local and remote diagr

## Infotron Systems Corp.

## (609) 424-9400

Supermux 600
The SM600 multiplexers are available in two models: the 16-channel SM616 and the 32-channel SM632. Both units support synchronous and asynchronous data transfers up to 9.6K bit/sec. Pione to point and multipoint oragurations are also supported. Switching and load balancing improve network efficien cy. Front-panel indicators and switches das play system status, automatic speed recogni ion climinates separate speed-dedicated li ports and rotane Proce \$1,900 - \$3,370

Supermux 380
The Supermux 380 concentrates up to eight asynchronous input lines on a sargle high-speed output. The inputs can be any combi tion of dial-up and dedicated lines with mixed protocols and speeds of up to 9.6K bn/ ser. All eight inputs can be 9.6K bit/sec., and point-to point configurations are supported. Price \$1.450 - \$2.600

#### Micom Systems, Inc. (805) 583,8600

Micom Box Type 2 Micom Box Type 2 features a modular de sign. The Featurepak design provides soft vary flexibility by which a customer car change the operating characteristics of his Micom Box 2 simply by changing Featurepaks. Available Featurepaks include those for X.25 pent-to-point and multipoint configurations. Proce \$1,490 -\$3,990

#### Micom Box Type 3 Microm Box Type 3 ientures include wi

band operation, supporting speeds to 72K bit, sec., a 56K bit/sec untegral JSU, which is thromus channel operation. It also supports 19 2K butisec on all channels.

Price \$1,790 \$4.290

#### Micom Box Type 5 The Micom Box Type 5 is a high-ea the success box Type 5 is a right-capacity 32 channel multiplexer with a standard RS-232 composite. Microm Box Type 5 modulanty al lows a customer to add new user channels by

ules. No tools are required to install them. In addition to the modulanty, Micom Box Type 5 Featuremaks are available in both corr or enhanced types as well as integral ISU and 16.8K ht/sec. integral modern Price \$3.050 - \$5.450

#### Paradyne Corp. (813) 530-2000 Audel 2030

The Model 2030 represents the entry-level in the Paradyne multiplexer family It is front panel configurable and provides extensive di-associacs and statutacs exthering. The unit is available in four- or eight-port models with or available in rour- or eigni-port models with re without an internal 9.6K bit/sec. modem. The composite link can run up to 19.2K bit/sec... the aggregate input is 76 8K bit/sec.

#### Prive \$1 500 \$2 900 DCY 825/871 he LXX 825/871 is Paradyne's med range

multiplexer, which is equipped with an internal 9.6K bit/sec modern. The 825/871 can accommodate 32 users and an aggregate input of 153 68 bit isec. The composite link can run up to 19.28 bit/sec. The 825/871's "onward link" option provides the ability to gle or multiple point-to-point knes brought back to a 825/671 and then linked to an Price \$3,000 \$4,506

#### DCX 840

CX 840 ne DCX 840 represents Paradyne's top-ofthe-line multiplexer family. It can accommo date up to 240 users and 15 composite links These links can have an aggregate uput of 353K bit/sec. Paradyne also provides a vari-ety of specialty cards for specific applications. Proc \$8,000-\$100,000

## The DCX 850 is the same as the DCX 840

Inc DAA 80013 to same as the DAA 800 but with the added feature of the user switch-ing option. This option provides poet conten-tion, queuing, user switching, automatic re-routing and automatic load balancing. Prior 88:000-8100,000 DCX 861 The DCX 861 is a low-end four- or eigh

#### The ENLX 861 is a low-end four- or eight-port statistical multiplexer with a built-in 9.6K birl

modern. It is compatible with an analysis multiplexer control option, which is part of the analysis network management control sys The DCX 861 has an aggregate input of 38.4K htt/sec.

#### Timeplex, Inc. (201) 391-1111

Microplexer Series III
The Timeplex Microplexer Senes III statists cal multiplexer features statistical multiplexing of asynchronous and synchronous data, support for one to four data lanks with up to 48 input/output ports, traffic-balance capability with dual- or guad-link models and multiex-Price \$2,300 \$4,630

#### The DTMsi ... multiplexer (TDM) and statistical multiplexer combined into one unit. It provides port ds of up to 38.4K bit/sec. for synchrone TDM and 9.6K butsec, asynchronous/synchronous/synchronous for the statistical multiplexer. It supports speeds of up to 64K bit/sec data his ports speeds of up to see that link. It provides combined TDM and statistical multipliciting of up to 44 ports of synchronus or asynchronus. over a wideband data! Price \$5,880 - \$6,600

Networking Microplexer The Networking Microplexer offers a have of two standard series with 96 or 144 ports and sox data links, integral switching and port contention, compatible with the ching Micropiexer product line; faulttolerare system design, automatic alternati routing, traffic balancing capability; six data link rates of up to 19 2K bit/sec. standard; and statistical multiplexing of both asynchronou and synchronous data Proce \$13,050, \$19,900

#### Quad Switching Multiplexer The Quad Switching Micropicser unit com-bines switching with statistical multiplexing and can connect more than 240 ports either locally or at multiple separate locations using high-speed data links. Remote habbing and traffic balancing features permit a variety of configurations. The unit offers switching and contention with four user-definable port types, selecting, contending contention and dedication, four data briks for flexible netwo

configurations, data link rates of up to 19 2K bit/sec. per data link; traffic balancing capabili and automatic alternate routing Price \$4.300 Switching Microplexer The Switching Microplexer offers integra

#### witching and contention with four user-defin

able port types: selecting, contending, con-tention and dedication. It has automatic alterate routing, two data links for network configurations, data link rates up to 19.2K bit/sec and statistical multiplexing of asynchronous and synchronous data. It is Quad Prive \$2.800 . \$4.210 Research assistance provided by Data

pro of Deiran, N.J.

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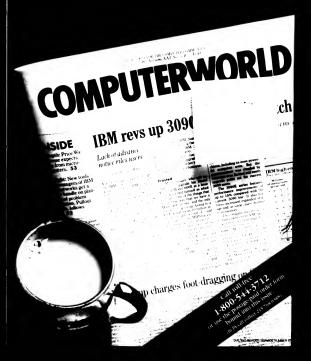
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## **SYSTEMS & PERIPHERALS**



### The myth of the MIPS

The usefulness of processor price/performance numbers tossed about by computer vendoes and the trade press is overrated, according to a theory ofer three consecutive profitable fered by the Wall Street

westment firm of Sanford C Bernstein & Co. A study by Bernstein analyst Mark D. Stahlman rauses inter

esting points and tries to answer the 40-year-old mestion of which computer is note for which customer.

Stahlman seems to but the mark with his statement that most users don't make dec sions based on ratings such as milion instructions per second (MIPS), and that such performance numbers don't make a vendor successful, particularly in maturing segments of the computer market. Even the use of MIPS as a measure of relative performance is flawed by the widening gap between the values MIPS assigns to IBM sys-

tems and Digital Equipment Corp systems. Stahlman says 1 n IBM MIPS equals 1 9 to 2 1 DEC VAX MIPS, on an average Continued on page 57

## Masstor overcomes IBM threat

BY ALAN ALPER NEW YORK - In early 1985 IRM told its customers it would not support a mass-storage sys

called the 3850 - on future generations of mainframes. That decision, many observers felt, would be the death knell for Masstor Systems Corp., a strug-ging Santa Clara, Calif.-based maker of compatible mass-stor-

Yet, three years later - after four consecutive years of losses totaling \$38.5 million -Masstor is surviving. Indeed, the 11year-old firm has strung togeth

Manufactures and System

1RM 3090-200

IBM System/36

DEC VAX 11/78

IBM System/38

11/782 11/785

DEC VAX 8600, 8650

Unisys Corp. 1100/90

IBM 4381

IBM 3081

18W 3084

10 IRM 3083

Data View

Top 10

IBM 3090 Model 200 leads competition in U.S. general-purpose installations

Total Purchase

16 250 /

2 961 2 673

2.587.4

2 070 0 3,450

1,719.3 1.563

PARAMETERS ON A DESCRIPTION A HARM THE PATT LINES.

quarters and says it expects to nosh fiscal 1987 in the black The mayenck firm still ma kets a mass-storage system that uses video recording techniques to store a minimum of 55G bytes on tightly wound cartindges that are kent in honeycombed modules. The M860 features rebotic

arms that automatically load and unload cartridges. Today, Masstor appeals to IBM users' efforts to reduce

costs and save precious data center floor space. Masstor is emphasizing data storage management that advocates migrating less active data from costly du rect-access storage devices (DASD) to its mass storage sys-

Installed

Systems

4.971

1.593

17,565

328

tem. The firm is also playing up the faster access times and high er rehability of its approach vs reel tape drives and IBM's 3480 cartridge tape drives IBM, which withdrew the

3850 last year, has advised our tomers to replace the massistor one system with addrsons 3380s. The strategy, which IBM hopes will provide it with a revenue jolt, is not only expensive for users but consumes precious floor space in the cramped quar

ters of their data centers. One dedicated Masstor cus-National Westminster Bank USA - a bank with \$10 Continued on page 58

## Service in demand

BY STANLEY GIBSON

MOUNTAIN VIEW, Calif. -More and more users want their systems symbolic all the time and expect to pay less for this capability. That is one of the con chisions reached in a report on large-systems service released recently by Input, a research firm here.

Users have observed that hardware is becoming increas ingly reliable and have pressured vendors to reduce hardware maintenance prices to reflect the reduced costs of servicing these systems, the report says

Continued on page 56

## Wyse touts multiuse terminal

BY JAMES CONNOLLY

in a single product

SAN JOSE, Cald. - Wyse Tech nology has announced a terminal designed to feature ASCII, per sonal computer, American Standards Institute (ANSI) and Digital Equipment Corp. compatibility and graphics

The Wyse WY-99GT, which is list priced at \$649, has multi pie keyboard options that allow a ser to work in ANSI DEC VT220. multiuser personal comronments. The terminal also features a dedicated graphics coprocessor for compatibility with popular graphics standards such those of the Tektronix. Inc 4010 and 4014 terminals

Wyse claimed price and funcmabty advantages in compan son with competing vendors. For example, the company said the WY-99GT supports text and high-resolution graphics at a lower price than DEC s text-only VT220

#### Inside

 NEC Information Systems buys Imagen's IP/II mage processors. Page 56 • IPL adds System/36 mem ory cards to its line of IBMcompatible memory up grades, Page 57

## SYSTEM 2000 DBMS for Only \$12,000

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ou don't have to spend a bundle to get a full-function data base management system. For a first-year fee of \$12,000. SYSTEM 2000\* DBMS gives you:

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graphics. You can even give Intorn Center users access to your DBMS nics. You can even give Information through easy-to-use SAS menus.

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Box 8000 SAS Circle Cary NC 27511-8000 19191 467-8000 Telev 802505



#### Service

CONTINUED FROM PAGE 55

Recently, IBM offered users discounts and free seven-day-a-week, 24-hour service in exchange for the users taking over some maintenance duties through the Corporate Service Amendment to the IBM Maintenance Agreement.

IBM Maintenance Agreement.

The study reports that average user requirements for system availability have risen from 96.7% in 1983 to 98% in 1986 and will likely exceed 99% within the next from 1987.

"Large users are reabstraily demanding 100% washlabny," said Rick Brusselas, masager of the customer service grana at Ingut." There is only so much you can do by sending a field engover faster," he added, explaining that, in the past, manufacturers reled on better manufacturers reled on better manufacturers reled on better manufacturers reled on better manufacturers produced and faster response by field engoneers to provide better service. But response and repair tunes have reached the limit of diminished returns, but posted our garricularly in larger systems.

ns, in which response times average

1.2 hours and repair times average 2.7 hours. Future progress in hurdware service will come only by increased use of redundant systems. In addition, remote support must unclude actual lixes, not merely diagnostics as it currently does. Also, the service organization will need to use artificial intelligence and expert systems to ad onsite and remote support per sound in diagnostic as the support per sound in diagnostic and the support per sound in diagnostic and remote support per sound in the support per sound in the

## DEC option vendor links VAXBI, VME

ALBIQUERQUE, N.M. — Acon Systems, Inc. is now shapping its VAX Bus Interconnect-to-VME, adapter, known as Viva, which is an intelligent interface that coencects. Digital Equipment Corp VAXBI-based machines to the VMEbus. Viva, the first in a sense of seven planned DEC option products, consists of a VAXBI board and two VME boards, aca VAXBI board and two VME boards, ac-

ding to Aeon.

The bus converter, designed for the serospace industry, provides simulation and real-time data requirements to be serviced through the VME instrumentation bus directly to the VAXBI, the vendor claimed. Designed for high-speed, direct memo-

Designed for ingn-speed, airect memory access transfers. Viva reportedly provides a data link in excess of 5M byte/sec, within a 50-ft radius using accepted interface standards.

The interface includes a full-displex

The interface includes a full dispect. 85-422 interconnect at up to 10M byte; sec., two direct memory access channels with 8K bytes of first-in, first-out memory meach direction, a)11 microprocessor on the VAXBI port. a Motorola, line. 68020 microprocessor on the VME side and full handshaking to eliminate buffer overrun, the vendor saxi.

Viva lists at \$15,000 and is available from Acon 60 days after receipt of order. The Alboquerque-based firm is a DEC-licensed option vendor and a wholly owned subsidiary of Aquila Technologies Group, Inc.

#### OTOT EMB & T DATE HEALTH

nostics and problem resolution, the company concluded.

However, these advances will not bring significant revenue growth in hardware service. To attract more business, Input advised, service companies should nursue nonhardware maintenance, such

as software support.
While the researchers projected that hardware service revenue will grow only sightly downing the next four years, software support revenue is expected to ruse 24% per year. Input found that users would be willing to pay more for software support it is would improve their productions of the project o

## NEC, Imagen ink product deal

s, Systems, Inc. recently signed a five-year, and a 22 million agreement with Seata Clara, Calif.-based Imagen Corp. to purchase that firm's IP/II image processors and its aging resident d

Impress page-description language.
The imagen products will be integrated with NECS Unru-based Astra XL/32 multisuser moncomputers and EWSE advanced engineering workstations, according to NEC Information Systems. Users can link the systems to 30 page/min, 300 dolub. Juster mitters, the wender

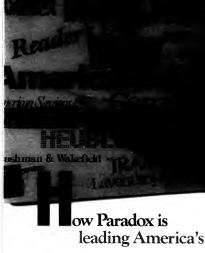
Imagen's IP/II image processor is an intelligent subsystem that reportedly can ninting devices.

printing newices.

Ta. The processor off-loads the host computer of the print control function, manits aging readent document-processing software, type-faces, graphic arts foots and atcommunications interfaces, NEC

> The image processor is based on three Motorola, Inc. 68000 microprocessors and imagen's proprietary real-time Rasterization technology. This configuration enables true

> throughput at the printer's rated speed, according to a NEC Information Systems statement.



#### Myth of MIPS

According to Stahlman, price/ performance is a critical ingredient for fueling growth in new markets where a product fits in well with a large class of unaddressed applications. But claims of price/performance advantages won't help personal computer vendors steal large numbers of customers from main frame vendors, he says. Even proven ven dors can't rely on price/performance advantages to carry them, he adds, citing

the case of Data General Corp. "Data General has experienced an erosion of OEM support while its revenue growth lags [behind] that of the minicomputer market in spite of impressive benchmark statistics. For that matter, dozens of smaller competitors routinely attempt to gain market share with per-

formance-based product positioning While products that can deliver 50% to 70% better price/performance (relative to DEC and IBM) undoubtedly open some doors, the evidence is overwhelming that performance alone cannot produce sustained market-share gains Stahlman says

Looking at life-cycle costs So, what does the user in an established market want? Stahlman points to co stry advertising slogans that boast of solutions and total fit of a new product. He says users look at life-cycle costs and the ability to accomplish useful work based on throughput under actual work loads. Stahlman says dependence on measures such as MIPS "ignores the overriding significance of software at

both the applications and systems lev-Performance numbers are useful when they are based on actual bench marks, according to Stahlman, who cites the public-domain Dhrystone and Ar-

gonne National Laboratory's Linpack as the best tests now available Stahlman's report provides valuable nsight into the strengths of various benchmarks and the failings of industry observers who rely too heavily on mea-

sures such as MIPS But a couple of relatively minor points

should be added in defense of those who refer to MIPS, including Computer

Who releases MIPS ratings?

First, Stahlman gives the impression that vendors release MIPS ratings only at the insistence of the trade press. It is true that some vendors, IBM included. won't publicly discuss MIPS at all, and some companies will do no more than confirm that MIPS estimates are in the ball-

park for their systems But many other pundors true than own MIPS ratings or are all too reads to provide ratings when asked. The latter companies usually answer the media's request with something like, "Well, we don't believe that MIPS is a good measure of a system's performance, but since you

asked, we think it will do X MIPS, which is twice what our commentation offers In addition, whether they should be doing so or not, many MIS organizations still look for a single performance num ber that they can attach to budget prop als or requests for bids. Those users, of ten bound by corporate rules or government policies of which they have no control still count on MIPS ratings because, guite simply, nothing better has come along. Stahlman is right in saying that live benchmarks such as the Dhry stone are more accurate. Unfortunately those results are seldom publicly avail-

able when a system is announced What both the computer industry and the MIS manager need is agreement among the vendors on a couple of bench marks that can be run before a system is delivered to users -- with any lock at all it would be before the system is intro duced. The ideal would be to have a test that would measure the overall system throughput of heavy transaction loads on a commercial DP system and another

measuring the raw CPU performance that seems so popular among technical us ers such as engineers and scientists. People like Stahlman who bammer home the need for realistic benchmarks as well as the value of supporting software are providing a service to the industry as

well as to the user community Connells to Combuleranted's sensor editor as a IPL designs

#### Paradox is taking over the database standard at hundreds of top companies by making it easier

Today more and more top compan are shifting their database standard. Af-ter evaluating dBASE\* and R:BASE\* and every other-base, they're reaching one conclusion—a powerful relational database called Paradox.

to get more done.

"It has set the standard for the future." says Greg Salcedo of California's American Savings & Loan. "Out of the databases I've used, Paradox is easily the best," reports Juliet Hubbell of Toshiba America. "Paradox occupies an impor-tant niche dBASE couldn't fill," concharles Fred Parlato of Corpora Preser

#### Friendly Acquisition

Hundreds of companies agree: Paradox is esster to learn, easier to use, and more "We compared Paradox, dBASE and R-BASE side by side. Paradox made it easier to do more," says Marty Hathaway at American Airlines.

By working with our familiar Lotus like interface and intuitive "query by ex-ample," users easily analyze data in ways viously beyond their capabilities. "With Paradox we're getting information that was just too difficult to reach be-fore," explains General Number of acsunting firm Deloute, Haskins & Sells

#### Capital Gains

Paradox is faster than dBASE across the board, sorting records at twice the speed "The only thing you give up when you leave dBASE is frustration," norm Sakoolo. Paradox Application Language (PAL) helps programmers build nich applica

tions in less time, cutting development costs by up to two-thirds Everything considered, it's no won der that at Trammell Crow, eight de nts independently decided to make it their standard.

#### Mega Trend This grass roots support is sweeps

companies everywhere. Paradox is tak ing over the database standard at own & Williamson, Sperry & Hut chanson, Litton Guidance and Control. and hundreds more. Observes software developer Burt Akantara: "Paradox to clearly the standard for speed, perform-ance and ease of use. Widespread acceprance is making it the industry standard

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## largest takeover

APRIL 27, 1987

#### System/36 memory cards WALTHAM, Mass - IPL Systems, Inc. continued its string of IBM-compatible

memory announcements recently with the introduction of 2M- and 1M-byte memory cards for the IBM System/36 The offering of the add-in memo cards comes in the wake of recent IPL introductions of memories for IBM main

frames and System/38 municomputers. The new cards were designed for u in System/36 Model D processors IPL claimed a price advantage of 67% in comparison with IBM memory boards IPI which also manufactures systems

compatible with IBM 4300 mid-range units, said its 2M-byte cards cost \$4,200 and the 1M byte cards cost \$2,625.

#### Masstor

CONTINUED FROM PAGE 55

- refuses to bring in additional DASDs. The U.S. subsidiary of National Westminster Bank PLC of the UK which, for the last year, has been using one M860 with 55G bytes of storage for programmers creating test environments will bring so another unit this year notes Harry DeHaven, vice-president of data center operations and technology

The new M860 will handle production data as part of the bank's effort to provide more efficient data storage management. National Westminster's parent recently signed an add-on contract, potentially worth \$7.3 million, to use additional Masstor M850s and services We look at the M860 as an interim

sten between archiving on more expensive DASD or on less expensive tape in a shorter period of time," DeHaven says.

Cauld save \$2 million More importantly, the bank figures it will save \$2 million in its 1990 capital budget

stalls the M860 this year rather than bringing in additional 3380s The rationale was that if we can hold DASD growth to 30%, rather than the 40% to 45% that is the industry average, we'd save a lot of money," DeHaven ex-

Other Masstor users seem drawn to

the M860's automated cartridge-handling system as an alternative to the inefficiency and expense of manual tape mounts Even the IBM 3480 with a chutetype loader feeding up to six cartridges does little to cut tape-mount time and

Part of the problem is that data centers rarely use more than 10% of the capacity of the tapes in their libraries

faster and cheaper to get another tape. says Michael Beadsmoore, senior vicepresident of marketing and systems de-velopment at Masstor. "People rarely put ore than one data set on a tape.

Dne data center manager, who is a large Masstor customer and who requested anonymity, brought in the M860 three years ago to reduce tape mounts and, ulti mately, data center expenses

In 1983, the firm mounted 800 000 tapes. The firm projected that unless it found a way to automate the process it would mount 1.2 million tapes this year.

This data center manager says that in the three years his company has used the M860, tape mounts per year have in-creased to 850,000. "We've probably saved about \$2 million a year because of he points out.

Yet other users are suspending judg ment on the cost savings of the M860 pending the release later this year of Storage Technology Corp.'s 3480-compatible tape drive with its automated tape han ding and library storage modules.

Dne Masstor user says he is considering the Storage Technology 4400 automated tape library with its 3480-compati-ble tape drives. "STC is providing 20 times the storage in the unit that Masstor " he notes. "That in itself is worth

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your special blend of information. IBM CICS ent with OS VS. MVS or MVS-XA. Let's talk. Call 414-355-5900.

#### Up against the wall Masstor, the user says, is "up against the

wall" because it has not been able to reduce the cost of its product. "With the STC product and optical coming, it's going to be tough for them," he adds Masstor's Beadsmoore says he is not

worned about Storage Technology's 4400. "There's no way it can handle 163

Concerning optical, Beadsmoore says Masstor's video recording techniques will eventually offer greater densities and higher reliability Meanwhile, some users - particularly

those in government and the insurance industry - have remained loval to the concept of mass storage. In fact, some IBM 3850 users - such as Nynex Corp. have shifted to the M860 because of their commitment to the technology. Beadsmoore says the withdrawal of

the 3850 has created opportunities for his firm. In a recent bid, IBM proposed to replace three 3850s with disk and tape drives totaling \$18 million. "Dur solution cost less than \$6 million," he recalls. There were huge economic pressures that helped make the decision in our fa-The Masstor unit costs \$550,000 in its

most basic version Nynex, which had used 3850s for a number of years, replaced the IBM units with Masstor products in April 1986. "We got rid of the 3850s because they were not reliable and were slow," recalls Trentolm Turner, senior systems analyst at a Nynex data center in Boston

The company now has two M860s with 55G bytes of storage each and has not experienced any problems. "We're not setting any calls in the middle of the mght like we were before," Turner jests.

Like other Masstor customers, Turner says Nynex is not concerned about the future of mass-storage technology or its vendor's viability. "We're willing to live with the risk," he says. "We've not had problems and will buy add-ons as we need

Despite IBM's withdrawal from the market, M860 users are not worried that IBM will not support the product in the fuire. "With the software we have, the M860 looks like two tape drives to our system," National Westminster's DeHaven notes. "There's no question that IBM will continue to support nine-track tape drives

## w

E

removal, 3-D rotations. Z-clip Turnkey systems oing and local pan, zoom and ro-Data Professionals, Inc. has announced its Messenger/De-The Project Review Terminal

is available for use with Calma's

Digital Equipment Corp. Micro-

vax II-based Dimension III sys-

terns. It consists of a 19-m color

monitor, alphanumenc display,

livery Management multiuser and multisite computer system. The system is said to feature ntegrated order entry, billing and dispatch; accounts receivable, remote location access, a counts payable and general ledger: personnel management,

productivity report; and management analysis Base price for the fully integated local-area network sysem, including a Novell, Inc. 286 file server with two 85M-byte hard drives and tape backup, No veil Advanced 286 Netware and the Messenger/Delivery Management software, is \$25,000.

The price per workstation is \$1,400 plus cabling and printer, the vendor said. Data Professionals, P.O. Box 4356, Seattle, Wash, 98104.

#### Processors

Bicc-Vero Electronics, Inc. has announced the VME48201

controller for the VMEhus. The board includes a daught erboard and an RS-232 personality module. Features include 8K bytes of erasable programmable read-only memory and 8K bytes of dual-norted random-access

The VME48201 is priced at \$595. With 32K bytes of RAM, the controller costs \$695.

Bicc-Vero Electronics, 1000 Sherma Ave., Hamden, Conn. 06514

Heurikon Corp. has intro-duced its HK68/VE microcomputer for the VMEbus.

The HK68/VE is said to offer the 10- or 12 5-MHz Motorols Inc. 68000, up to 1M byte of onboard dynamic random-access memory with parity, up to 256K bytes of erasable programmable read-only memory, two RS-232 serial ports, a single 8/16 ISBX mailbox-interrupt poort and full interface to the VMEbus with system-controller

The HK68/VE is priced from Heurikon. 3201 Latham

#### Drive, Madison, Wis. 53713. CAD/CAM/CAE

General Electric Co.'s Calma Co. has announced the Project Review Terminal which is said to allow designers to walk through three-dimensional computer models in real-

The terminal is said to allow users to display conceptual afternatives, construction-ready designs or existing facilities. It performs shading and hidden line DUCTS keyboard, tablet and Graphson controller

The Project Review Terrored mes a price tag that starts at

Calma, 2901 Tasman Drive, Santa Clara, Calif. 95050. **Graphics systems** 

Greyhawk Systems Inc. hts nounced a line of paperless

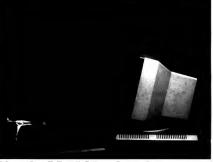
plotters including the Softplot 2222 color plotter and Softplot 1222 monochrome plotter

The plotters feature either raster-imaging or vector-plotting capabilities in a single mathine According to the vendor. document annotation is accomplished in real-time Softplot 2222 produces a 1,024- by 1,024-pixel raster dis-

play in 30 seconds or a full-color D-size raster display in up to 180 seconds with 120 million addressable points and a resolution of 460 dot/in. Pan and zoom fea tures are standard

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Greyhawk Systems, 1557 entre Pointe Drive, Milpitas, Calif. 95035.



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ortant than computers.

#### Data storage

System Industries, Inc. has ounced the Quick Disconnect System for its Digital Equipment Corg.-comnatible disk drives

The Our's Disconnect System is said to allow small form-factor disk drives to be removed from enclosures. Formatted capacities of removable System Indus tries drive modules range from 320M bytes in the 5%-in, package to 522M nytes in the 8-m. form. When removed from a Quick Disconnect enclosure chasus, each drive module is interchangeable among all System Industries Quick Dis-

connect chassis of corresponding size Prices vary depending upon configura-

tion. A two-drive 5%-in. Quick Disconnect System in a 19-in rack is priced from \$16,900 to \$19,400

Drive, Milpitas, Calif. 95035.

#### Terminals

Recognition Equipment, Inc. has in-troduced an RS-422 interface package for its Tartan XP series of expanded proces-

The Tartan XP series consists of three systems that allow up to 32 operators to share additional processing power, disk The RS-422 interface is said to allow

any of the terminals on a connected bus to access the Tartan XP system without the

need for multiple cables connecting the processor and terminals

The RS-422 interface package, including two Tartan processors, two processor-to-terminal cables and two local-area

network interface units, is priced from \$4 995 Perm Equa et P.O. Box 660204. Dallas. Texas 75266.

#### Printers/Plotters Micro Trends Corp. has announced

that its Model 92160 dual-purpose IBM twinaxial/coaxial printer controller is no available for the IBM System/34, 36 and 38 and mainframe plug-compatible com-

The Model 92160 is said to emulate

the IBM Model 5256, 5225, 4214 and 5219 twinavial printers as well as the Model 3287 and 3262 coaxial printers. It offers a print throughout speed of 60 page/mm. According to the vendor, it allows true plug-compatible operation and does not rely on an outboard box-type protocol

The Model 92160 is priced at \$1,150. Micro Trends 5709 Three Notch Road, Mobile, Ala, 36619.

#### Power supplies

Lowell Corp. has announced the Emer-son UPS1500, a power-protection system for networks, supermicrocomputers,

microcomputers and graphics applica The Emerson UPS5100 is said to proride from 20 to 40 min of backup power. It protects against all power line fluctua ons and provides 1.500W of 120V, 60Hz

full sine wave AC power. It features an audible utility nower failure alarm and has a front-panel LED operation status display The unit comes with four grounded plug receptacles for output power

The Emerson UPS1500 is priced at

Lowell, P.O. Box 158, 97 Temple St., Worcester, Mass. 01613. Shape Magnetronics, Inc. has intro-

duced a portable plug-in Computer Line Tamer power conditioner The 2.500V ampere power condition er is said to remove noise and voltage

spikes and compensate for brown outs and overvoltages. It was designed for use with computers, peripherals and microcircuit-based systems ranging from private automatic branch exchange terminals to typesetters to photographic equipment The portable, plug-in 2,500V ampero

Computer Line Tamer is priced at \$717 Shape Magnetronics, 901 DuPage Ave. Lombard, Ill, 60148. Input devices

Data General Corp. has announced the Model 5244BC bar-code terminal, which is said to incorporate the functionality of the vendor's Dasher D215 line of display terminals with an integral bar-

The terminal also features a bar-code selection menu. An auxiliary printer teriace provides local or pass-through operation The bar-code terminal supports asyn-

chronous, full-duplex communicati and is compatible with RS-232 and RS 422 communications devices. The Model 5244BC is priced at

\$1.595 Data General Rt. 9, Southboro, Mass.

Barcode Industries, Inc. has intro-duced the Minibar, a bar-code reader stud to interface as a weeken to more than 50 terminals and personal computers

Data from the reader is sent to the disay in keyboard-emulation format. The Minubar is said to be able to transmit data in RS-232 format to cash registers, com-

puters and terminals. The Minibar supports input from mag-netic stripe readers, hand-held laser diode scanners and RS-232 devices The Minibar is priced at \$465.

Barcode Industries, 17 Barstow Road, Great Neck, N.Y. 11021



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## IN DEPTH

## Over the rainbow in a software garage shop

Your programmers may thrive on pure thought, not rigorous control

## DV WILL LAM BADDICAN

he original programmers came from every where - they were mathematicians, teach ers, English majors physicists and others from a variety of professions. No general critena existed for their selection: The selection process came down to. "Find someone who likes to program and we'll see if they are any good at it." So began the software

profession. While professions like mechanical engineering and architecture evolved over hundreds. if not thousands, of years, software engineering was pressured to mature into a profession in less than a decade. The culture methodologies and management strategies would it was assumed materialize overmaliz

Recent articles and papers at tempt to formulate engineering methodologies in hopes of enhancing software engineering productivity and professionalism. Productivity gains were in fact realized in the 1970s when new methodologies were introduced, but further gains are elusive. This article proposes that gains in software engineering productivity can be achieved, not by new engineering methodolo-gies but through the develorment of a professional environ-

My first encounter with programming was on the RCA Corp. Bizmac, a large vacuum-tube computer of the 1940-to-1950 era. Programming on the Bizmac

Harrison is an engineering manager Boca Rator, Fla



ted of writing down numbers that represented the instruction operation codes and necessary memory addresses a tedious process at best. Toward the end of the Bizmac era. RCA introduced a symbolic assembler cailed Easycoder. It was a much-welcomed software engineering methodology.

In the 1950s, few programmers or engineering managers possessed a solid hardware background. Management's view was that programming would never develop into a profession - certainly not an engineering profession. Another widely held belief was that universities

would never offer a degree in a subject such as programming Programming departments brought under control, and, cess will produce a series of ab-seemed to grow like weeds within reason, the software func-stract and intangible compo-Hardware engineers did not tioned in the prescribed manner.

have time to write test programs, so someone who had a knack for it was given the assignment. Tasks that initially were thought to take a week soon reourred man-years, and departments formed around those tasks. The size of software proj ects continued to grow, with predictable results. Most managers lived in fear that the software project would never end

what it was expected to do. The chaos ended when new software engineering methodologies, such as structured design, were introduced and rigorous controls were imposed, a viewpoint enforcing the methodologies implementation. Projects were

But the combination of method ologies and rigorous controls ap pears successful only in companson with the disorder that existed prior to its implementation. When compared with the productivity that is ideally possi ble, these methodologies may be a very expensive approach.

#### Pure thought

A true science of software engiand, if it did end, might not do neering can never be formulated with engineering methodologies alone. Software development is almost a pure thought process and is better understood from a psychological and humanistic

> Except for the final product the software development pro nents that, to developers, are

- · Softwore engineering in human terms
- · Overcontrol: a license to stop thinking
- When will a true software science arise?

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are almost living entities but appear to those outside of the process as a series of cryptic notations. Even design reviews do not penetrate the depths of these entities. Only the minds of developers understand

then Because software develop ment is an almost pure thought process, further gams in development productivity will not be achieved by rigorous process control or complex methodologies. Management overcontrol and methodologies can lead to boredom and a general slowdown of the thought process.

#### Success stories

A phenomenon of the past decade is the "software garage shop." Successful software ga rage shops appear to produce large software programs at very cost and above average reliability. In most cases, these shoos rely little on current engineering methodologies. Many

ONTROLS and methodology carried to the extreme are essentially a license to stop thinking

large companies such as Micro soft Corp. and Apple Computer Inc. started in the 1970s and 80s as garage shops. A software garage shop is made up of a small number of highly skilled programmers. each of whom is given a high level of responsibility. These pro grammers communicate well with each other. They enjoy

working together and like what they are done The shop engronment is such that problems can be resolved quickly. For instance, if a per sonal computer or pece of test equipment is needed, it can be procured without delay Re quirements problems are reolved, usually by talking with the company president.

The only rules followed are the following: · Everyone must be treated and must behave - like a pro-

Isnousi · Everyone must be committed to the objective. Common sense must prevail A reasonable question is.

What is meant by the expression "professional engineer?" word "professional" implies the person can be expected to be have in certain ways. Assum ably, he will display a high level responsibility The hiring manager's confidence that a per son will behave in a professional manner is insually based on that person's education and expen

All professions exhibit some

controls, but the level of control disasters caused by the anarchy imposed on a large Software of early software engineering project's team in many cases resembles the level imposed on unskilled labor in a manufacturing environment. Many projects control a software engineer's ac tivity to the level of micromod-

This level of control can be

Many software departments give new programmers a copy of the software design handbook or

standards manual and say. There will be no deviations from this manual. What they are really saying is that the engi about the design problem

carried to the extreme are as sentially a license to stop think ing: Programmers do not have to be concerned because "the system will take care of the prob-A software standards manual

should be a living document, updated continuously by a depart ment's software engineers, its contents should recognize that

of knowing when standards should be applied in torce and The elapsed time required to

complete a project varies with the level of control applied (see chart page 69). Too few controls produce an undescriptined environment in which it is impossible to make progress Too many





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manoower in the controls cess and reduce motivation. The shortest possible development time results from an ideal level of controls - a level found only in a professional development envi-

ronment riority of needs Some ussights into the problem can be gained by comparing

from a psychological point of view, the environment in a high ly structured and controlled department with the environment in a software garage shop. Consider behavioral psychologist Abraham Maslow's theory need, which states that a human's needs are hierarchical in nature: from the lowest point they are as follows:

 Physiological needs — the need for basics such as shelter. food and warmth. • Safety needs — the need to nate threats and danger Social needs — the need to be long and fit into a group • Ego needs — the need for self respect, self-confidence, self-esteem, status, autonomy, recognition and appreciation

 Self-fulfillment needs — the need to realize one's potential. in general, the needs at the low end of the hierarchy are giv es proprity, and the needs at the upper end are inoperative until the lower needs are satisfied. Ego considerations are not important to a man who has not had a drink of water in three days Once he drinks all the water he needs, ego needs may become

important

A highly structured department is effective at fulfilling the lower physiological and safety needs: Structured departments are almost always part of a large company which in most cases of fers greater financial security. By contrast, in a software garage shop the threat of the busin failing hovers constantly. How the garage shop is better at fulfilling higher needs - self-fulfillment, ego and social — which lead to high productivity.

The two development er ments offer differing fulfill nt levels of the various needs Self-fulfillment. A characteristic of the most productive software engineers is that they are always working toward selffulfillment. The software garage shop is fulfilling because it lets creativity soar. The engineers not feel bound by regulations They believe that all ideas are

worth considering and that man agement will respond positively Structured departments, or the other hand, by definition all most close off new ideas. There

#### Optimum level of control

In a development cycle, too many controls on developers can be or dispatrous as too few controls in terms of mosting deadlines



is no way to handle new ideas;

they do not fit into the existing structure Ego. In a software garage shop, instant recognition is given to anyone who does anything to help the project or the company Rewards come quickly in the form of money, lunches and

In a structured department, software engineers in many cases do not try to get recognized for an accomplishment, be lieving management, through a lack of understanding or because

CW CHART SUSAN ALDAS of problems in the structure of the department, may com mise or even eliminate the accomplishment in some cases. managers may take more than their fair share of credit. Social. The software garage

shop staff's small size is ideal for ng social needs. This staff is a tightly knit team that knows how to work and play together People in a structured department tend to band together in small groups of two or three peo ple. These groups tend to defen

ment and other employees. In most cases when a new software engineer soms a large structured department, he feels that his social acceptance is equivalent to that of the new kid

Safety. A garage shop pro vides safety at a high level on Maslow's hierarchy but not at a low one. Software engineers in a garage shop never feel threat ened personally: that is, they be heve they will always be treated fairly and that their integrity will be safeguarded. However, they are threatened by the fact that the garage shop is frequently on the brunk of financial disaster

The structured department is good at fulfilling basic salety eeds, since it is usually part of a large, well-financed company cause of the unusual social structure of a large department. though, an individual's personal integrity can be unfairly threatened. For example, Group A might claim their software com nt is late because the design of software component B, which they must interface with it too

Physiological. In many cases, the small garage shop cannot afford extras lake a cafetena nd adequate air conditioning These things affect productivity themselves from both manage-On the other hand, larger

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the acclaimed text "Learning to Program in C' by Dr Thomas Plum, international authority on C and technical advisor to Hands On Learning

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nes usually possess ample inds for items such as these. Not too many years ago, the government asked Lock heed Corp to build an advanced airplane for reconnaissance ourposes. The airplane had to be capable of flying very high, and it had to be built in record time. Lockheed responded by im-

27, 1986), a term from the comstrip, "Li'l Abner." The firm's most talented engineers were gathered together and asked to uild the airplane in record time They were told to use profes sional judgment in an attempt to hynass traditional levels of pa perwork. The engineers in the skunk works teams were successful and gained fame through

The following are some guidelines for building a software skunk works team. The team of people selected should be viewed as profession-

· The team should always run lean. That is, if the project at hand is estimated to require 10 people then it should be at-

close physical proximity but should be isolated from the main pority vote if it believes that member is not carrying his share ware department of the load. . The major goals of the project must be stated clearly.

The team should be told that at as responsible for determining which methodologies will be used and what level of control is necessary, although management will retain veto rights. The team can expel a member by ma-

Flexible work hours should be permitted. Each software engineer should attend the necessary meetings. Weekly status meetings should be held; highly motated people like to talk about what they are doing. The meet ings should be as much a social affair as a status check, an open dialog of how things are going, with the general level of participation in the discussions telling management bow things are

for tracking and drawing up schedules, but milestone setting

HE TEAM should run lean. If the project at hand is estimated to require 10 people, then it should be attempted with nine.

should be done on a participative basis. Outstanding performance should be rewarded in the form of time off, lencheons, trips and

Management should take the view that all ideas are worth his tening to and should establish two basic rules: Everyone most be committed to what they are doing and must behave in a proional way. Quality is expected from everyone

Think like a man Most important of all, the manager of the skunk works team must think like the manager of a small company. He must be demanding in terms of commitment and quality and must convey a sense of urgency and importance about the work that is being done. He must know the management profession and understand people. He must be quick to implement changes when he is convinced that the change is an improvement.

This article does not intend to advocate abandoning work in progress on software engineer ing methodologies. The point is that professional software engineers are fully capable of determining which methodologies ap nly and to what extent the should be applied. If 10 man-days have been budgeted to review 10 modules, the software engr neer may know that it would be better to spend the entire 10 days on a single module because of its complexity

The software development process cannot be made into the equivalent of a machine with a crank on its side that is turned when some software is needed Software development is a profession and must be approached as such if true gains in productivity are to be realized .



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## MANAGEMENT

# AKING

#### Big Brother looks inward

rank an EDP audit with a bad case of haves or having a tooth pulled," according to MIS guru Eirem Mallach, But MIS managers in the private sector have it easy compared with those working in the federal govern

The level of scruting - cnt m, second-guessing and backseat driving - in the fed eral government is intense. Not only is there the EDP auditing eral Accounting Office (GAO). but also the White House Office of Management and Budget, the General Services Admirus tration, contract appeals boards and even the federal

courts Worse yet, federal MIS managers are faced with the grand inquisitors" - the versight committees of the U.S. Congress and the news media. Both of them rely heavily on the GAO audits. It seems as though the GAO

has never seen a DP system it likes, but it would know it if it saw one. GAO reports have titles like: "USDA Needs to Better Manage Field-Office Computer Parchases" and "SBA Needs to Strengthen Management of its Computer Systems "The U.S. Social Security Administration Continued on page 79

## Incentives drive Alamo's MIS shop to support that growth Alamo has doubled its computing

BY JAMES CONNOLLY

FORT LAUDERDALE, Fia. An outgoing man with an easy smile and a strong handshake, Thomas S. Loane seems eager to talk about the strategies of his MIS operation as well as his

company as a whole Loane, executive director of computer and communication services for Alamo Rent A Car. Inc., not only ties those strate gies together but presents them as the only logical way to go. As a result, it makes sense to him that MIS employees should be paid

bonuses if their systems work and not be paid extra when sys-

Loane makes no secret of his pride in Alamo's growth and the power each year for six years. owing from an IBM System/3 shop to the point of upgrading from an IBM 3090 Model 200 to a 3090 Model 400 later this "We have to be smarter, be

faster, be better. We can't outspend our competition. But the converse is that we can out-bu reaucrat them. Our company president, Michael Egan, sits 100 (ret away from me, and I can walk down there with a half-milbon-dollar equipment request and get it approved," Loane

He emphasizes that Alamo has kept its corporate staff lean, experimented with customercar rental contracts installed leading-edge — though mexpen - technology such as "throw-away" printers and instituted personnel policies based on performance. "We spend our time implementing rather than

writing proposals." Loane says The simplicity and common sense approach that are part of the company's mandate have helped Alamo clumb to the No. 5 tion in the car rental bus ness after 10 years of active operations. Loane says. "We as a company are very large, but we are also very small. We are try ing to grow at 30% a year while

oceping the same number of emwees in headquarters Loane carries out part of the

Continued on page 74

## Quality group is launched

BY DAVID A LUDLUM

The newly formed, nonprofit Society for Information Systems Quality, which plans to hold its first conference next year, has started planning a professional development program that emphasizes personal and business

Leaders of the society, which was was formed in February, say they hope to absorb 13 milenenassurance or gangations in major cities as area chapters, according to society President Anthony Salinger.

Salinger, a manager AT&T's marketing information systems department, says the society has a goal of attracting 10,000 members in its first year and a half. The society plans to hold its first annual meeting and conference in San Diego next spring, according to Salinger. who has proposed annual membership dues of \$50

The society hopes to attract the buyest luminaries in the field' as speakers for the confer ence. "We're shooting for an annual conference that is really going to be a big deal." Salinger

In recruiting members, the group is targeting quality assur ance specialists as well as those whose work involves quality techniques, such as operations and development managers consultants and academics

Its activities are to focus on icing the personal success of members and include services uch as sending letters that rec Continued on page 78

#### UPDATE

# Life in the small shop

BY MICHAEL SULLIVAN-TRAINOR

Parkleigh Pharmacy in Roches-ter, N.Y., he is ushered to Art Freeman's second-floor office. Freeman is sandwiched be tween a 10-ft-long desk covered with accounting ledgers and an equally imposing table that serves as a platform for an IBM System/23 Datamaster desktop business computer. It is a natural place for the man who is the store's controller and data processing manager

"Often, the salesmen don't even realize I'm the controller, and some of them say, We can sneak this purchase through. I know it's more expensive, but, beck, you can convince them it's okay." Then I say, 'Well, I'm Continued on page 73



#### David Blackwell: Info execs can be slow to adopt change David J. Blackwell, widely known dreds of awnores selling its indi-The Prodertial Insurance Co. of colors, without if you had 10 or 12

as an information systems insovator, recently retired as executive vice-president and chief administrative officer Massachusetts Mutual Life Insurance Co. in Springfield, Mass. Duning Blackwell's tenure. Massachusetts Mutual became in 1975, the first commercial user of Amdahl Corp. products and developed some of the first on-line systems for insurance. In the early 1970s, the insurance firm rolled out the Respond net-

work, which automated the hun-

vidual policies nationwide and linked them to each other and to the home office. In the late 1970s, the company developed the Magnet system, which per formed similar functions for the 30 offices selling group life and health insurance

Blackwell graduated from Haverford College in Pennsylvania in 1949 with a degree in political science. He served as executive director of data processing at Educational Testing Service before working with

America for 18 years He somed Massachusetts Mutual in 1970 as second vice-president of the EDP department later organized the firm's Info mation Services Division and evertually assumed responsibil

ning and information services Blackwell 60 now is launch ing a consulting practice aimed insurance companies and

firms that want to sell to them and, with a partner, is forming Insurance Systems Roundtable meetings for sponsoring compatres. Before dome so he is tak ing time off in Arizona, where he was reached by Compate records Senior Editor David Ludlan

What do you see as future directions for outomotion in the insurance field? Well, there's a whole new gener along for most insurance compa Their administrative systems have always been aimed at policies rather than at the indi

policies you wate represented and banks, the time has come to relate la system) to a - hem rath er than to a policy. Autoet all the through a study period of how they are going to make that tran sition In the group life and health area—the price of entry is getting higher. You have to have a suphotogred claims as tem not only for paying claim:

Continued on have 77

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#### Small shop FROM PAGE 71

the man that has got to be con vinced.

Small data processing shops such as Parkleigh, a one-store business, offer MIS prifessionals opportunities unheard of in large companies - like Freeman's dual role as manager of finance and DI

Just ask Athelene Gers MIS manager for Goldstein & Manello a Boston law firm "It's more to be the person who is perceived to be the masrmind behind it all." she says Or John Hornfeldt, who par-

layed a 20-month start as MIS do ctor of a small agency, the Massachusetts Society for Pre vention of Cruelty to Children (MSPCC), into the directorship of MIS/EDP auditing for the State Auditor of Massachusetts In a small shop, you are reinsible for everything, just as in a large shop, but you operate

and execute everything as well, In Freeman's case, the mix decisions about enumment nurchases are closely field to his nem experience in using the system. Because he is a satisfied user, the company has relied on the same System/23 Datamaster product that has been discontin-



ued by IBM - for the last five Freeman's overrishng conwere about finances also means. he wrote until the last minute hefore adding enumment to the

I feel much more budget ssure than another MIS manager does. But I'm freer to make a quick decision." he says

The first major addition to the current configuration at Parkleigh did not come until people were tired of signing up on a wall chart to schedule time on the Dutamaster's sole computer terminal. At that time - two years ago - a local network and two terminals were purchased.

When he decided to buy the network. Freeman exercised his dual authority by simply picking up the phone and placing the or der. The network was delivered and installed within a month. We bought a network only for the areas where we needed it, and that was in two other offices. The network they would love to have sold us was for five terminals. But we went with what was cost-effective for us. Freeman says.

A part owner of the company Freeman had retared from the retail houness after a heart attack. But Parkleigh's owner pergaded him to return to get the \$3 million specialty and gift shop

Shortly after he took the con troller position. Freeman be-came DP manager out of the necessity to automate the store's financial activities. The most namful part of his DP education occurred during the installation

of the Datamaster and its associ-The most difficult challenge was convincing the executives within the store to go along with what was required to make the system untk There is a large amount of back-breaking work required to develop a whole sys tem from scratch. One has to have a tremendous amount of

aith to carry it off," he says Creating and fine-tuning the programs for inventory control or accounts receivable required Freeman to work 70 to 80 hours a week

'Now, the system is blissfully weet, and I'm beginning to act like a normal human being "he says

Before he moved on to his current position. Hornfeldt also worked up to 70 hours a week as MIS director for the MSPCC Because he was one of only two full-time MIS employees. Hornfeldt spent his days hopping from task to task. His hectic schedule blurred the distinction bets managerial duties and basic DP necessities For example, shortly before

he left the society in February Hornfeldt installed a local-area network of 20 Wyse Technology PC-286s The project was ac complished while he continued his regular duties, which ranged from preparing for board of directors meetings to repairing



ourgment breakdowns

In the morning he did file backups and system garbage collection, and in the afternoon he would plan the best way to configure the systems in the agency's headquarters and 10 region

#### Blessings of a small shop

Freedom to dabble in all realms of data

Chance to focus on what the manager likes to Being perceived as

Tight control over all aspects of the operat

The blessing of a small shop is that you can make progress on a project without plodding along through a single task. Other data processing professionals are limited to a task within their job function, such as programming or operations. As the MIS director of a small shop, you can move fluidly between tasks.

Though Hornfeldt had a long

viewing statistics on system per formance to see if the disk drive configuration can be improved

Inevitably, the phone rings and Gesseman's day begins in earnest. Inquiries range from questions about obtaining overand word processing functions to when the system will provide liti-

long-term project, such as re-

Fortunately, system crashes rived at the firm, she has had to battle an attitude that, despite

morning to inform Geneman

about the status of repairs

are infrequent. Geneman's greatest challenge is not technical but managerial. Since she arthe organization's continuing growth, the current system and DP staff are sufficient to meet the lag-firm's needs, for now and the future Arguing this is especially hard because of Geiseman's age

(she is 26), her relative inexperi-

ence in the business and because she is dealing with lawyers. To meet this challenge she casts terms and backs them with research and lengthy documentation For example, a recent report she wrote on the need for bugation support and a cess to outside data bases included footlaw reviews and quotations from

I'm not sure I buy the argu

manager of Parkleigh Pharmaci

she says

Geneman must also be prepared

for emergencies. For instance,

the system went down recently

because of a hardware problem

on the main system's disk drive

That meant she had to arrive at 6

a.m. to greet the Wang techni-

crans and analyze the problem as

well as speed their progress on

had to get all the users who need

ed to operate back on the re-

With all the users operating

on three disk drives instead of

the enuryalent of five - the one

that went down was twice as

large as the others - Generous

had to monitor the system all day

and have users log off when

problems developed. The phone

calls during the crisis came at

three or four o'clock the next

mainder of the system

standing interest in electronics. he worked as a minister and laier I plan things to do but I nesas a social worker before becomer spend my whole day don't them. There are only two of usleader. He moved into his curhere and my assistant handlerent career track when the state the hardware. When the printer agency employing him needed is down, he gets that call. But someone to help design a user in there's only one person people

terface for a batch system. After successfully completing his first DP job, he moved on to subsequent projects within the Massachusetts Department of Social Services, Los moxture of social services and DP positions entually led him to the MSPCC post, where he stayed

for nearly two years. Il Freeman is as much a budget watcher as he is a DP manag er and if Hornfeldt is a jack-of-all trades, then Geneman is ourckly learning the skills of a lawyer as well as an MIS director in her small shop

For Geiseman, a typical day starts when she sits in front of her desktop terminal and checks the disk capacity of the Wang Laboratories, Inc. VS 100. which provides administrative applications for Goldstein & Manello's 75 lawvers. Assured that the system is up and running with no chance of imminent di saster, she sets to work on a ment that because I'm 26 I don't necessarily know as much as a 36-year-old MIS manager "she

The distinction between manavenem and administrative or technical tasks is an important one for Gerseman because she perceive to be the answer per arned her current position after son for the system and that s working her was up through While she maintains a confortable 45- to 50-hour week

tant word processing supervisor in a Washington D.C. law firm and then became word priving supervisor at McClennan & Fish, another Bos

Despite the constant cital lenges of overall management and day-to-day operations. Ger seman would not reads her now tion for a less varied one in a large

to go behind the CPU and search through about 300 cables to find the one I want, "she says, "But I like this position because I don't en day is different. You miss one issue of any trade publication and ou're belund. It's a little bit of a burden, but it makes life very in



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#### Incentives drive CONTINUED FROM PAGE 71

mandate, including an incentive bonus pian for MIS employees prompted by Alamo's corporate policy of offering incentives to as many employees as possible. For example, car washers are paid a \$1 bonus for every car washed. But that pool shared by all car washers, as docked \$2 for every complaint about a dirty car

If you divide that up among them in portion to their hours worked, that could be 50 cents or a drillar an hour added to their regular pay," Loane

In implementing the policv. Loone had to determine which elements were important and how to quantify

For computer operations, those elements included up time and completing batch sobs and daily tasks on time. A bonus pool for the operators gets a 10-cent contribution for every minute of uptime when the average response time is than one second. But the pool is debited

\$10 for every minute of downtime Simple math will tell you that the break-even point is 99.5% uprime, which is the service level that we originally set ti yng are dning a good job at 99.9% you are going to wind up with a bonus that could be \$300 a month. But there also have been months when they got nothing." Loane says.

Batch jobs earn the operators' peol \$25 for each day all reports are on time, but \$50 is subtracted for each day even The programming staff has a separate pool, which grows or shrinks based on

whether the company makes money, projects are on time and systems are reliable A company profit of 1% earns the proap. There also is a \$100,000 pool that is doled out on the basis of the timeliness of

completed programming projects, with major projects bringing in \$5,000 to \$25,000 to be split among the group. But reliability becomes a factor since the programmers' nool grows by \$100 per day when there are no CICS outages and shrinks by \$200 per day when there are

Bonuses depend on more than the workers' ability to keep systems running or to complete projects on time, however, They are subject to the failings of manufacturers' mistakes when equipment de fects bring down a system and to airlines that drag their feet on joint Alamo-airline

If a thermal conduction module fails in the 3090 mainframe, operators must mine muze the downtime by getting around the failure and re-starting the system. The programmers collected only 60% of their \$100,000 timeliness pool last year, in part because some arritines were slow in im-

plementing joint projects. Alamo officials say they have found no other compames that provide incentive bonuses to such a broad range of employees; many firms offer bonuses only to the upper 10%

of management. Loane emphasizes that the incentives are in addition to the employees' regular columns. The homesus one limited to 25% of a worker's base salary

By way of the 4-year-old program, MtS bonuses last year tended to be in the \$2,700 to \$5,400 range. Loane notes that operations personnel reached their goals in 10 to 12 months in 1986, and that those goals were made slightly tougher to reach this year because of improving hardware reliability

"Everybody's success is based on ev-eryone else's." Loane says. "We want our imployees to be fanatics. We want people who are gong ho about their jobs. If some one screws up the bonus for everyone else, they are going to hear it from every

#### Training courses receive awards

ATLANTA - Computer-based training courses developed by the state of Tennessee and Blue Cross/Blue Shreld of New Jersey have won awards from Goal Systems international, inc.

The Phoebe prizes are awarded on the basis of creative use of Phoenix, Goal Systems computer-based training system Finalists were chosen by sudges for regional Phoenix users groups and the winers by judges at the Sixth International Phoenix User Group Meeting

A training course critifled "Dbase IL" developed by Ken Kimbro for the state of Tennessee, was chosen as best course for its "dever use of graphics and scenarios to tell a story," said Rita Richterkessing.

a Goal Systems marketing manager An award for the most creative ique use of Phoenix went to "MMIF. which stands for major medical int on, developed by Brian Flynn for Blue Cross/Blue Shield

The rudges' criteria included screen design, student appeal and interactivity,

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Users. Houston, May 3-7 — Contact: Gary Carson, Synercom, 10405 Corporate Drive, Sugar Land, Texas 77478. AUUA, Inc. (Sperry Users) Spring Conference, Orlando, Fla., May 3-7 Contact: Randal L. Leonard, Gay & Tay lor. Inc., P.O. Box 1410. Winston-Salem,

BLIS/COBOL Users Group Annual Kartashev, Dynamic Computer Architec-Meeting. Orlando, Fla., May 3-7 — Contact: BLIS/COBOL Users Group, ture, Inc., Suite B-309, 3000 34th St. S., St. Petersburg, Fla. 33711. Suite 110, 222 S. Westmonte Drive, Alta-

ational Association of Synercom

106 Fulton St., New York, N.Y. 10038 Eastern Communications Forum 87. Stamford, Conn., May 4-6 - Contact: ECF, 505 N. Lake Shore Drive, Chicago, III, 60611.

BankAL Brussels, May 5-6 - Contact: Society for Worldwide Interbank Financial Telecommunications, Al Business

Unit, Avenue E. Solvay 81, 1310 La Hulpe, Belgium Eighth National Online Meeting. New York, May 5-7 — Contact: Learned

nformation, Inc., 143 Old Mariton Pike. Medford, N.J. 08055.

18th Annual Meeting of the Appli-

ns Software, Inc. Users' Gro New Orleans, May 5-8 - Contact: Unversity of Michigan, Data Systems Center. 2021 Administrative Services Build ing, Ann Arbor, Mich, 48109.

Second International Optical Storage Forum. Denver, May 6-8 - Contact: Cartlidge & Associates, Inc., Suite M259, 1101 S. Winchester Blvd., San lose Calif 95128

Southern California Regional Users Group Annual Trade Show & Conference for Hewlett-Packard users. Pasadena, Calif., May 6-8 — Contact: Ka-ren Zimmerman, SCRUG '87, P.O. Box 84219, Los Angeles, Calif. 90073

1987 International Conference & Exhibition on Health Industry Bar Coding. Atlanta, May 6-8 — Contact: Automatic Identification Manufacturers. Inc., 1326 Freeport Read, Pittsburgh, Ps 15238

The Fortune/Seybold Group Desktop Productivity Conference: Turning Expectations into Realities. New York, May 7-9 -- Contact: The Seybold Group, Inc., Suite 100, 100 Homeland Court, San Jose, Calif. 95112.

#### MAY 10-16

Software Maintenance. Toronto, May 10-13 - Contact: Interex 680 Almanor Ave., Sunnyvale, Calif. 94086.

API 87. Dallas, May 10-14 - Contact: APL87 Registrar, Suite 210, 440 Northlake Shopping Center, Dallas, Texas 75238.

VIP '87 - Duquesne Systems Ioternational Users Group. Chrago, May 11-12 — Contact. Donna Bartko. Duquesne Systems, Inc., Two Allegheny Center, Pattsburgh, Pa. 15212.

Audit Managers' Symposium IX. Hit-ton Head Island, S.C., May 11-13 — Con-tact: Jane Evans, MIS Training Institute, 4 Brewster Road, Framingham, Mass.

National Info/System User Group Conference, Philadelphia, May 11-13 - Contact: Mike Turgeon, Northeast In fo/System User Group, P.O. Box 1698. Boston Msex 02205

CD-I/The Future Conference, San Francisco, May 11-13 — Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N.Y.

Desktop Publishing '87. San Francis-co, May 11-13 — Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N.Y., 10018.

APICS Logistics Conference and Technical Exhibit. Dallas, May 11-14 Contact: Communications Department, American Production and Inventory Control Society, Inc., 500 W: Annan-dale Road, Falls Church, Va. 22046. Intercompany Networks: Strategy

and Implementation. New York, May 12-13 — Contact: William Smulsky, The Yankee Group, 200 Portland St., Boston, Mass. 02114 Continued on page 81

## Second International Confere Supercomputing and First World Supercomputer Exhibition. Santa Clara, Calif., May 3-8 — Contact: Lana

monte Springs, Fla. 32715.

Eighth Annual Meeting of the Inter-

the Healthcare Industry. Dallas, May 4-5 — Contact: Frost & Sullivan, Inc., IS YOUR COMMUNICATIONS NETWORK
A MONUMENT TO THE PAST?



## Blackwell

but for gathering claims data and helping the client keep his costs and that's being imple mented through fairly sophisti cated new computer systems. In the long run, I think only a few companies will be able to finance the cost of entry in that area

Can you assess the state of alternatives to IBM nov campared with it in 1975? If you're looking at the plugnoatible mainframe area, you still have Amdahl and NAS as the two alternatives [for] the people that are in an IBM mode, which, after all, in the insurance busi ness happens to be almost everyhorly. So I think there's still an

opportunity there, not only in

the mainframe but in disk and in

tape. And I see that opportunity uing. The insurance industry, like all industries, is putting in more and more workstations instead of dumb terminals, and I guess it's a little early to assess what the new IBM announcement is going to mean. Many of them have been content to use the original PC base, and I wonder whether or not they aren't so en trenched with that that they may

be reluctant to move up both in

the cost and the change that's

required to take into account the functionaley

In the management area, I think you can see that the stan dard that was set by Apple for user-friendliness, to use a trite word, has now really been picket up by IBM: and they're all sort of following) the same approach And I think that will effectively put workstations on most man agement desks in the insurance ness. It happens to be coming along at a time when access to data is also becoming much easier. You see the ability for the first time, really, to do what we've been talking about for 20 years - and that's Itol set up

management information sys-

tems instead of processing sys-

What would you say is the mast Important principle for an information systems organization in i

There are two very different models for that, and I wouldn't say that one is better than the other. It really depends on what's happening organization-



ally in the rest of the come One model is to decentralize strategic business units, and the other is to keep information systems) heavily centralized. And I think which of those is used really depends almost entirely on how the rest of the company is organized. If the company becomes heavily decentralized then it probably makes a lot of sense to break the pieces apart and embed them in strategic humness units. Some commonies

have elected to continue to run if as a centralized service organization. You can make a case for enther one, depending on the environment

What would you say are the mast Important quali-fications far an Infarmation systems director

Well, he has to be a businessman first and a DPer second. I think that's the primary qualification. I think the technology changes ramily enough that a fellow can

really become pretty knowledgeable pretty fast in the tech nology. I used to think we had a fiveyear rollower: I think it's proba-

## Mold training to individual

WELLESLEY, Mass. - Reeness to computer trainmusical one tend to respond rela ing may vary with the type of intively well to programmed in telligence exhibited by an struction, Reid said. individual, according to an infor-In contrast, users whose mmation systems consultant and telligence is predominantly ver-

hal do well by reading documenpsychiatrist. The type of intelligence can tation while those who lean affect how someone learns, actoward spatual or artistic intellicording to Theodore Reid of sence do better when they are first presented with an overall Phoenix, a psychiatrist and consultant with the Dooley Group who addressed a workshop last Users whose intelligence is of a personal nature - focusing on week sponsored by the Center

for Information Management their own or other people's feel Studies at Babson College. ings - learn best through indi-Users whose intelligence vidual or small group instruction, tends toward a logical-mathe-Red sad

bly more like 31/2 or four years now IAn information systems manager | can also become tech nologically obsolete fairly rapidly. So the critical thing for him to be as a good manager

changed mast significantly since you began wark-ing closely with them?

They've become much more in rolved and knowledgesble. If you go back, even to the time I came to the Mass. Mutual 17 years ago, they liked to tell an or ganization what to do and expected it to be delivered later on without much intervention. That's no longer true in most or ganizations. People are deeply volved, and I think the PC and the educational programs in universities have made them all much more computer literate And, therefore, they want to get

involved and are capable of get-Now, a salesman still wants to be a salesman and not a data processor. But he knows much hetter what to ask for now than he once did. And I think that trend will continue. People will become more and more computer literate as the educational system changes.

What do you find most surprising in looking back at the evolution of systems and their use? Well, you know things don't hap pen as rapidly as a lot of us think they could. I think many of us have been bullish over technology changes and thought things would happen much more rapidly They could have, technologi

I think you find that people resast change, including data processing people, and that the hange has been slower than one would have thought it

If I've been surprised, it's beause change has been slower

could have been. When we put in Respond for example we ex pected every other insurance company to react within two or three years and leapfrog us. The fact is that there are comp 12 years later that haven't ever

matched it vet So I guess if there's been any surprise it's been the slowness with which technologs has been

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## On-line service supports professional trainers

nonprofit organization is exploiting another computer application for the training of computer users in a new on-line network available through Compuserve Information Service from Com-

puserve. Inc National Training and ComDPTrain, which it calls an on-line cooperative, or forum, aimed at advocating quality in computer training and support and encouraging those who train computer

users "Most organizations are continually reinventing the same

utive director of the project. DPT am is an effort to share resources and improve the quality and effectiveness of computer training," he explained.

After two months of operation the service has 1,000 members, according to a statement that focus on the case of teaching

fees for using the service beyond the normal connect charges for the Compuserve Information

The service features publicdomain courseware, reviews of hardware and software products

users to operate the products on-line seminars for trainers and listings of job openings and resumes

tion efforts is mind-boggling." Masse said. "We are seeing plans for 20,000 to 30,000 users to be added to corporate systems within a 12-month period. Those efforts require a real sensitivity to the training issues."

## Quality group

members' accomplish ments to their superiors. Salineer explains

Educational programs, which will emphasize personal and business skills, are to include semmars, nublications featuring success stories and tutorials and opportunities for networking. such as computer conferences

Salinger says that while qualty assurance professionals must know certain techniques, many of their failures have come from lack of skills such as team leader. tion and self-marketing.

Technical skills Technical skills the group will emphasize include metrics structured system development methods, security standards sures of hardware capacity, desum and code reviews and documentation conventions

The chairman of the society is Pat Ragozzino, a senior manager with Peat, Marwick, Main & Co. in Cleveland

The vice-president is Belden fenkus, a consultant based in Middleville, N.J. Edward Kim ball, a program scientist with Vector Research, Inc. in Ann Ar bor, Mich., is secretary and Law rence Tracey, a senior program maoager with Unisys Corp. in



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## Big Brother

has 20 of the GAO's auditors with offices made its computer center in Baltimore. Much of this scrutiny is justified, of course, since the money spent on federal DP systems comes from U.S. taxpayers, and the government lacks the in-

herent profit-making and costcutting incentives of the business community. But the next time you snick-

er at the computer problems of the Internal Revenue Service or another agency, consider what it is like to be grilled by a congressional subcommittee You sit at a big wooden table in an ornate hearing room There's a microphone on the

table, hot television lights in the corners, a court reporter make ing a transcript and a rowdy group of blood-hungry reporters at the press table. You raise your right hand and swear to tell the truth, just like on Perry

The congressional commit tee has already heard the testimony of the GAO auditors, who have said your system is rotten your forehead.

to the core The committee chairman starts shooting questions at you in prosecutorial fashion

(Actually, many legislators are former prosecutors. They know very little about computers, but they are fed the tough questions by young aides who read the GAO reports.) Beads of sweat appear on

Sometimes the legislators get rather theatrical, particula ly when the TV cameras are rolling. One congressman, trying to dramatize his criticism of the Securities and Exchange Commission's so-called Edgar system, held un beg flash cards showing each of Edgar's initials. (Edgar stands for Electron Data Gathering, Analysis and Retneval.)

One by one, the congressman threw the cards up into the air as he charged that the Edgar system is no good at gathering analyzing or retrieving data

Political theater

"Congressional hearings have always been a form of political theater," according to a recent article in Roll Call, the weekly newspaper on Capitol Hill "But Watergate turned them into a media version of the Spanish Inquisition with lawmakers bar becung witnesses every day for months on national TV Roll Call says that Washing

ton rubbs: relations firms now of nal witnesses handle the tough estions and the pressure, in cluding staging mock hearings

Their advice includes the following . Bon't take the Eifth Amend ment unless you're in the Mafia - it makes you look guity · Wear conservative clothing and get rid of pervous habits, hi tapping a pencil on the table . If you don't know the answer to a question, say. "I don't have an answer for that, but I'll get it for you

 Above all don't one That means you are out of control

Berry is Constituterworld's Washington



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Continued from page 76

Infobase '87 — International Database Exhibition and Congress Franklurt, West Germany, May 12-14 — Contact: Messe Frankfurt GmbH, Lud wig-Erhard-Anlage 1, POB 97 01 26, D-6000, Frankfurt 97, West Germany,

The Information Advantage. London. May 13-14 - Contact: The Conference Board, Inc., P.O. Box 4026, Church Street Station, New York, N.Y. 10261.

Avignon 87 - Expert Systems and their Applications. Avignon. France May 13-15 - Contact: Avignon 87, B.P. 45, 92193 Meudon-Cedex, France

Network Users Association Spring Meeting, Atlanta, May 13-15 - Con-Network Users Association, Suite 400, 2111 Eisenhower Ave., Alexandria, Va 22314

Federal Conference on Electronic Publishing, Bethesda, Md., May 13-15 - Contact: Cahners Exposition Group, Box 3833, 999 Summer St., Stamford, Conn. 06905.

Eighth Annual Computer Law Institute. Los Angeles, May 14-15 - Contact: University of Southern California Law Center, University Park, Los Angeles Calif. 90007

oact 87 - Technology in Tom row's Classroom, Victoria, B.C., May 14-17 - Contact: Conference Services Box 1700. University of Victoria. Victorna B.C. Canada VSW 2V2

Conference on Human Factors in Computing Systems. Washington. D.C., May 15-19 — Contact; Association for Computing Machinery Conference Management, 11 W. 42nd St., New York, N V 10036

#### MAY 17-23

INTEC '87: The Conference on In-formation Resources & Technology Applications. Washington, D.C., May 17-20 - Contact: Carol Semon, Information Industry Association, Suite 800, 555 New Jersey Ave. N.W., Washington, D.C.

Infoweek '87. Dallas, May 17-20 -Contact: Uccel Corp., Marketing Communications (lo Financial Systems Division, P.O. Box 660054, Dallas, Texas

sition. New Orleans, May 17-22 - Contact: ICA, Suite 710, LB-89, 12750 Ment Drive, Dallas, Texas 75251 The Challenge of Evolving Technoles Conference. Orlando, Fla., May 18-20 - Contact: Scott K. Allen, Life Of-

fice Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327 rycon '87: Service and Se for the '90s. New York, May 18-20 -Contact: CESN Publications. Inc., P.O. Box 428, Peterborough, N.H. 03458

mer Forum West -- Harnessing New Technology: From Vision to Reality. Los Angeles, May 18-20 -

Contact: Michael Hammer, Hammer Fo-

rum West, 5 Cambridge Center, Cambridge, Mass, 02142

Meeting of the Minds '87, ADP National Accounts Division Users' Conference. Boston, May 18-20 Automatic Data Processing. Suite 580, 5665 Northside Drive, Atlan ta. Ga. 30328

Patricia Seybold's Technology Forum — Tools for Visionary Business Users. Cambridge, Mass., May 18-20 — Contact: Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston Marc 02100

Navy Micro/OA '87. Virginia Beach, Va., May 18-21 - Contact: NARDAC Norfolk, Navy Macro(OA '87, Norfolk Va. 23511.

Eighth Annual Conference on Applions of Computer-Aided Syste Engineering Tools. Ann Arbor, Mich. May 18-22 - Contact: Rebecca S. Size more, Meta Systems, Ltd., Suite 200, 315 E. Eisenhower, Ann Arbor, Mich.

Second International Symp the Factory of the Future. Montego Bay, Jamasca, May 18-22 - Contact: David W. Russell, Pennsylvania State University Graduate Center, 650 S. Henderson Road, King of Prussia, Pa 19406

ew Aids to Executive Decision-Making, New York, May 19-20 - Con tact: The Conference Board, Inc., P.O. Box 4026, Church Street Station, New York N Y 10261

Western States Government Technology Conference 87. Sacramento, Calif., May 19-21 — Contact: Government Technology Conference, P.O. Box 160288, Sacramento, Calif. 95816

Technobank, Geneva, May 19-22 -Contact: Technobank, P.O. Box 625, CH-1211 Geneva 1 Switzerland

erconnections '87, the Indeper dent Computer Consultants Association's 10th Annual National Conference, San Francisco, May 20-22 -Contact: ICCA. P.O. Box 27412, St. Louis. Mo. 63141.

Distribution Computer Expo. Chapgo. May 21-22 — Contact: C. S. Report, Box 453, Exton, Pa. 19341

1987 NYU Symposium: Technolog cal Support for Workgroup Collabo-ration. New York, May 21-22 — Con-International Communications As-sociation 1987 Conference & Expotact; Center for Research on Information tems, New York University, 90 Trinty Place, New York, N.Y. 10006.

#### MAY 24-30

Icographics '87: Second International Conference and Exhibition on Computer Graphics. Milan, Italy, Mas 26-29 — Contact: World Computer Graphics Association, Inc., Suite 399, 2033 M St. N.W., Washington, D.C. 20036

orkshops on Computer-Assisted Map Analysis. New Haven, Conn., May - Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect

St., New Haven, Conn. 06511. Also being held June 9-10 in Tucson, Ariz.; June 1 18 in Athens. Go.; Sept. 16-17 in Corvallis. Ore.; and Oct. 24-25 in Berkeley. Cald

CASE '87. First Internation Workshop on Computer-Aided Software Engineering, Cambridge, Mass., May 27-29 - Contact: Elliot Chikofsky Index Technology Corp., One Main St., Cambridge Mass 02142

1987 Information Manage Conference. Toronto. May 27-29 -Contact: John Hobbs, Data Base Associa tion (Ontario), Inc., P.O. Box 5639, Station A. Toronto, Ont., Canada M5W 1N8

ACM Professional Develop Seminars, Boston, May 30 - Contact, Gerry Hayes, Cullmane Hall 161CN, Col lege of Computer Science, Northeastern University, 360 Huntington Ave., Boston Mass 02115



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All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligibile for a prize. Il you are the only one to send in a winning slogan, you win the prize. Il more than one person had the same intelligent

idea, we'll pick the prize winner out of a hat Prize winners will receive a \$100 certificate good towards the purchase of software from a Iriendly neighborhood computer store.

All decisions of the judges will be linal and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of CW Communications/Inc. Deadline lor entries is May 1, 1987 at our offices in Framingham, MA.

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## COMPUTER INDUSTRY

## Cincom sheds low-key image



### A different shade of blue

When IBM Chairman John F Akers steps up to the podium in New Orleans this morning to ress his shareholders at the IBM annual meeting, he will do so as the leader of a company in the unaccustomed throes of

In the first 100 busines days of this year, the Big Blue elephant has been kicking up quite a lot of dust. Spurred by two straight years of declining ngs and the unprecedented (at IBM's expense, anyway) success of rival Digital Equip ment Corp. IBM has sent all kinds of signals out to the indus-

try so far this year IBM has billed 1987 as the be debatable. But it has unques tionably been the year of the IBM news release. Lasted together, a sampling of this year's events emanating from Armonk, N.Y., almost boggles the

 The upgraded 3090E series mainframes. In any other year this might have been the big first-quarter announcem year, it paled in significance compared with others . The new generation of Per sonal System/2 micros and the

Operating System/2: How to shake up an entire industry in one day. This could be the ulti mate test of IBM's market clout but its grades will not be in for another two years. . Systems Application Archi-

tecture. What is it? Either a brilhant and long-overdue strategy to integrate IBM's product line or a vague smoke screen to throw DEC off stride • The Corporate Service

Amendment A very aggressive wreaking havor in the indepen dest maintenance industry. On this one users win all around Letting the IBM sales force market hardware coming off IBM Credit Corp. leases, Independent dealers, brokers and essors do not like at but busi

BY IEAN S. BOZMAN

CINCINNATI - Traditionally a leader in software technology, Cincom Systems, Inc. has often advanced in product development at the expense of bottom ine sales. But with the planned introduction of several products this year. Oncom may be con templating the ultimate reversal

of its quiet image: going public.
"My charter," says Cincom President and Chief Executive Officer Dennis Yablonsky, "is to make the world aware of the great secret that is Concom-Yahlonsky says Cincom is

possed for a period of systamed growth that could bring the company's sales to the \$200 million level by 1992. The firm, which has devoted much of five years to developing products based on the Supra relational data base management system (DBMS). will now turn its attention toward marketing Yablonsky describes the com

pany as "product-rich," adding that Cincom would try to be more market-driven than it has been in the past. Yablonsky says he expects Cincom's sales to reach the \$120 million mark by the time its fiscal year ends in December, and employees are aiready talking about a possible prospectus describing the com-



namy's public offering of stock low-key image arises in part from the firm's relative geographic isolation company founder Thomas Nies's etown in the heart of the Ohn Roor Vallet: Each work Cincom's top management plays bost to customers and business partners flying in from the tradutional software corridors of Boston and San Francisco

But Cincom has a strring international presence that belies its landlocked, midwestern home. Some 45% of Cincom's revenue comes from sales in Europe, Japan. Australia and South America, particularly maintains 60 offices around the world; an internatinnal network links these offices and provides a means of software support and remote di-

agnostics for far-flung custom-In the U.S., Cincom kept a relatively low profile while it un dertook an intensive period of software writing dating from about 1982 to 1985. That was the time period when Cincom's software engineers laid the groundwork for Supra and relat-

Since 1979, Cinconi estimates, the company has spent an

One result of the Sugra emphases was that Cincom lost its footbold on the software systems marketplace. "Cincom lost

market share because it was get ting ready to enter the relational market says Ronald R. Hank semor manager for corporate re-"Win more about 18 months late with the Supra prod-Cincom does not intend to

make that kind of miscalculation again. This year, as a shift to ward marketing and sales speeds slip below 20% of sales for the time in recent years. Along with the move to mar

keting comes another toward multiple-vendor support. Ciri com's product focus has shifted from a predominantly IBM bne-Continued on page 87

## Aspen gets Aweida in stock swap

BY JAMES A MARTIN

LONGMONT Colo - Aspet Peripherals Corp. said last week it has acquired Aweida System Corp through a stock swap and named Storage Technology founder Jesse Aweida president and phairman of the

In theory, the merger see combine Aspen's manufactur ing strengths with Aweids Svitems' marketing capabilities. Asnen Peripherals is a resent start up company that last year introduced its only product, the Continued on page 87

## Silicon Valley firms angry with U.S.trade export con-trols. Page 8S.

 AT&T wins contract for nide integrated circuit pro-duction. Page 86. Hogan makes comeback without IBM aid. Page 86

## Vendors remain cautious despite boom quarter

The first three months of this year have brought higher than anticipated earnings and sales in many segments of the computer industry, but most companies

said they will continue to keep tight cost controls in place Orders were up for the quar ter, and companies said order rates increased steadily as the period progressed, with the highest activity being reported

"We think the computer nomy has turned, basically said analyst Peter Labe Drexel Burnham Lambert, Inc. I don't mean we're in some

boom period, but it has very clearly turned Financial reports released last week include the following: Prime Computer, Inc Cost controls and a surge in or credited for higher than expect

ed earnings, analysts said last Continued on page 88

dor posted a 28% increase in in-For the period Prime an nounced income of \$11.9 milcome on a 12% non-invaled for

1987 first-quarter earnings Unisys bounces into the black, earnings and sales improve

Orașies Company	July Jacoms Jack, March (Marcanada) (Calabary)	Proper Change from 1386	Reserved Jan. Mores (Monorado of delice)	Change Jean 250
Altee	2.8	-10	40.4	+7
Apolabi	25.2	+950	318.5	+59
Bridge Communications	1.6	+61	15.3	+66
Computer	0.8	-	35.6	+67
Micom	4.3	+169	52	- +11
Prime	11.9	+28	221.7	+13
Software Publishing	1.6	+334	10.9	+91
Stratma	3.7	+21	37.4	+39
Tondy	50.4	+20	776.9	+12
Uniter	110.2	_	2,400	
VM Software	0.79	+22	6.3	+46

sales of \$221 7 milion. In the comparable quarter in 1986. earnings were \$9.2 million, or 19 cents per share on sales of

"As Prime has a new product cycle coming later this year that

will benefit them, we expect the Impressed earning trend to consaid analyst Michael Geran of E F Hutton & Co-Geran forecast earnings of 28 cents per share for the current 'Given the general economi-

uncertainty, we will continue to investment in research and development funding, which now intals more than 11% of revesaid Joe Henson Prime s president and chief executive of Umsys Corp. The corpora-

of the former Burroughs Corp. and Sperry Corp announced sales of \$2.4 billion and morm Continued on page Si

## Computer Consoles targets Wang 2200 users

**Programmer Productivity** 

BY ALAN ALPER

WALTHAM, Mass. — Seeking to expand its share of the office automation systems marker at the expense of faltering competitors. Computer Consoles, Inc. is leveraging a software strategy aimed at winting resellers and ultimately converting users to its Unic based Power systems. "We're going after the wounded," said John Cunningham, Computer Consoles chair man and chief executive officer Computer Consoles is focus my its untial efforts on wenchmy its untial efforts on wench-

ing customers from struggling Wang Laboratories, Inc., the company from which Cunning-ham resigned as president in a highly publicased move in 1985. Computer Consoles recently announced a C compiler that enables office applications developed in Basic for the Wann 2200

to run on its Power minicomputers under Unix. The firm is also expected to soon release a C compiler for applications written for Wing's popular VS system. Computer Consoles, which is on the mend itself, revealed it is also planting to unveil compilers for the machines of other office automation systems vendors, including Datapoint Corp. and Prime Computer, Inc.

Computer Consoles hopes to penetrate Wang's large customer base, which is said to be frustrated by the firm's inability to get leading-edge products to market in a timely fashion. The Wang focus gives Computer Consoles's value-added re-

sellers a broad target muriet. Wang has shipped about 70,000 2200 systems and about 85,000 VS systems, former Mang sakes and marketing executives and The compiler for the 2200 gwes Computer Consides access to some Wang resellers that have recently been flushed out by the vendor, noted George Colosy, president of Forrester Research, Inc. The compiler for VS systems would gwe Computer VS systems would gwe Computer Systems would gwe can select the Systems would gwe computer Syst

er Consoles entry to Wang's



John Cunningham

Fortune 1,000 customers, a market in which the firm has a marginal presence, he added.

"CCI is groping for a sales

"CCI is groping for a sales strategy," Colony said. "In going after Wang, they're seeking a well-defined market that is ripe for the picking." Computer Consoles said its

Computer Consoles said its Power series offers Wang users a higher performance and lower cost hardware platform on whech to run familiar applications. The 2200 is an early 1970s writage machine that supports about 16 users. Computer Consoles's Power6/32 minrcomputer supports more than 100 users.

ports more than 100 users.

"The 2200 is an old product line for Wang that is not going anywhere for them," Curaingham said, "This gets us into the Wang market and users into the integrated software world with four integrated office automation system) Officepower."

Colony said Wang users might

Colony said Wang users might be attracted to the power and portability of Computer Consoles's Unix-based systems. Computer Consoles's Success in the Wang market, Colony said, will come down to outselling and outserviening its competitor. "That probably won't be difficult," be convented.

The C compiler for the 2200

— called Basic-K compiler
was developed by Kerridge
Computer Co. in the UK, a reseller that handles both Wang
and Computer Consoles sysContinued on page 85



## Vendors decry stiff U.S. trade export controls

Say laws protecting sensitive technology cripple access to foreign markets BY JAMES A. MARTIN

SAN JOSE, Calif. - The U.S. government's trade export controls on high technology are completely outdated and serve mainly to impede competition among American companies overseas, according to Silicon Valley companies that testified at a hearing earlier this month.

"Technology is moving so fast the gov erament has no ability to keep track of it. said Rep. Norman Y. Mineta (D-San Jose). In some cases, the process of obtaining an export license for a product may take longer than the product's actual technological life cycle

The U.S. Departments of Commerce and Defense, among other government entities, are concerned that sensitive American technology will find its way into communist or unfriendly countries. As a result, high-tech companies wishing to ship products overseas are often faced with a hureaucratic quagritine resulting in pounds of paperwork and months of de

lavs and frustrations. Such restrictions have helped more to create a blooming U.S. trade deficit than they have to keep important technology out of the hands of unallied government according to testimonies. Meanwhile, competing firms in Japan and other countries without those controls are able to move products and satisfy customers

Robert G. Smith, vice-president and chief financial officer of Sun Microsystems. Inc., testified that after Sun intro duced its latest generation of microcomnuter workstations in September 1985. the company found itself burdened with

bureaucratic requirements when attempting to expor We were told we would have to recerve, from the Department of Commerce, an individual approval for every machine we exported." Smith said. Addi tional approvals were required to ship

products to countries not affiliated with the Coordinating Committee on Multilateral Export Controls, an informal alliance formed to restrict strategic trade exports to communist countries

Waiting for Washington
"You can ultimately see what this did to

our selling cycle," Smith added. "Once the sale was made, the foreign customer had to wart weeks for Washington to approve the resale by our foreign subsidiaries to them As a result, it often took months for our foreign customers to recerve their products. It's impossible to de termine how many foreign customers we

Seven years ago, the U.S. high-tech industry emoved a trade surplus of \$27 bilion compared with a trade defect of \$3 billion in 1986. In addition, the National Academy of Sciences found in a recent study that export controls cost the U S some 188,000 jobs and \$9 billion a year

By making it exceedingly difficult for Silicon Valley companies to market their products overseas, our own government is subotaining his once-model industry said Rep. Don Edwards (D-San Jose) "It's apparent that our businesses here can compete in Japan or anywhere else they want to if the government wouldn't get in their way." Edwards said

### COMPUTER GRAPHICS THAT JOLT YOUR SENSES AND BRING YOUR IMAGINATION TO LIFE

ACM SIGGRAPH '87



#### Computer Consoles tems. Cunningham said Computer Con

soles is working with an outside con which he declined to name, to develop the compiler for the Wang VS system. Working with value-added resellers has enabled Computer Consoles to broad-

en its market penetration without throwing sales expenses into disarray, he noted Apparently, the strategy has begun to idends. For its first quarter of fiscal 1987, Computer Consoles posted a 68% increase in sales, to \$35.6 million, compared with \$21.2 million in the compara

ble quarter in 1986.

Computer Consoles's modest net in come of \$800,000, or 6 cents per share included a credit of \$300,000, or 2 cents per share. In the first quarter last year, a oss of \$5.6 million, or 47 cents per share. was recorded. The company said first-quarter orders

received by the company's California based computer products division exceeded expectations. Sales to customers in the communications systems industry in the first quarter also improved Computer Consoles, which was bem orrhaging when Cunnigham took over 20

months ago, has been profitable for three consecutive quarters. The firm is prosecting a pretax profit of about \$8 million this year on revenue of \$169 million. Continued profitability, Cunningham said, will help build confidence in Computer Consoles's office automation strategy.

"You don't do it with smoke, rumors and talk but with financial numbers." he con-Staff writer Alan J. Ryan contributed to they story

Please send a copy of the SIGGRAPH '87 Advance Program to: STATE/COUNTRY TELEPHONE ( ) 7P CODE COMPUTERWORLD

## Hogan rebounding; IBM aid not crucial

BY ALAN ALPER

NEW YORK — Hogan Systems, Inc., the unce-foundering banking software compains that has IBM as its exclusive distributor in the U.S. and Canada, is making a comeback without much assistance from the industry leader.

Speaking to securities analysts here.

Speaking to securities analysts here last week George McTayish. Hogan a president and chef executive officer, pointed to expense reductions and contracts signed with European banks as priman factors in the Dallas firm's resurgence.

For the first nine months of fiscal 1987, Hogan's revenue is up 36% to \$30.7 million, while operating profits are \$4.8 million, compared with a \$4 million loss for the corresponding period list year Hogan expects to release its fourthnuarter results this week.

According to McTanah latter or float gain's recent groups can be directly as tributed to the ferm's 11-month relationship with BiM. BiM. mitroduced a Soutengare based on Hogan's integrated retail braiking application software last October and made its first customer shape retail braiking application software last October and made its first customer shape full. Like, general manager of the services section of BiMs. Information Systems Groups and one or two BiM emergentaforages and one or two BiM emergentations. McTareah declarated to save how much for

McLawari excursed to say now much of heyan's revenue resulted from its relation-hip with IBM "IBM is not responsible for Hogan's growth IBM is responsible for meeting the marketing of our product domestically." he explanted.

## AT&T to make super chips for Pentagon

d contract said to be worth between \$19.8 million and \$30 million from the U.S. Defense Advanced Research Proocts Agency for experimental production of advanced gallumbar-sende integrated on units.

The Pertagon reportedly warts to use gallumrarserate chips for its computerized weapon sixtem because their process lader, use less power and are more resistant to randation than sixton chips with the four-vear contract. ATAT will use a catalable a long production line for galle umrar-serated chips that are faster and more combine than those production line for galle.

The chips will contain between 3 000 and 5,000 logs, gates per chip and operate in the 200-to 400 MHz range 47kH sad Robert Vehse, project uninger sad the challenge will be to develop production techniques that produce a cept-able vields of the high performance hips. The mandracturing of gallium-ar-sender.

The manufacturing of gallium ar-sender thins has been a slow, costly prices with AT&T plans to "jump way shead of the learning corve" by using production methods alreads perfected for silicon chips Velse and Osma Eralp, an antifect with Hamhrecht & Quist, Inc., and even if IBM does not self any Hogan software in fiscal 1988, Hogan's revience should still grow by between 10% and 20%. Bogan's dissiembling of its domestic sales-force, tighter expense controls and strong European buseness have put the company on solid financial ground, he said. Hogan has revently winde big contracts with Midland

recently mixed tig contracts with Minland Bank PLC in the UK and with banks in Holland and Portugal "I don't want to paint too rosy a picture, because there can always be problems for a company that does not have a

domestic sales force " Eralp said. "But compared with where they were a year and a half ago, they're now a real solid growth company." Stephen McClellan, an analyst at Mer-

rill Lynch & Co. who follows IBM, said it remains to be seen if Hogan's relationship with IBM will pay off. While the company has turned profitable after two consecutive years of losses. McClellan is uncertain whether the firm can flourish as a result of its IBM connection. "They've sown the seeds, but they've

"They've sown the seeds, but they've not harvested anything yet," he said.

John E. Steurn, assistant group execu-

tive of IBM's Information Systems-Group, attempted to dispel rumors that the firm was unhappy in its relationship with Hogan. He said IBM's year-long sales and marketing reorganization did not delay its efforts to get the banking applications to market, nor was IBM con-

templating replacing Hogain
Infact, Steam said, IBM is beginning to
assess future bealiang-system customer
requirements with Hogain
product pain has been drafted and is currestly being sized by Hogain, who will noone permay developer for the enhancements. The explained "Additional applicutions are being assed as wellas MYS/AA
and DB2 support, consistent with IBM Systems Application Architecture direc-

# How to take the high risk

#### SAN FRANCISCO, CALIFORNIA • 8 15 A M

An in eight now exery by Jim councily, in International Based Group's verbely. Comparerworld, immediately acrouses the apprehension of the chief Information Officer (Glo) of an international company headquartered in California. The new Services Team Plants to purchase for their international offices is reported to be experiencing an alasming rise in downtime.

A multi-million dollar decision hangs in the balance.

#### FRAMINGHAM, MASSACHUSETTS • 11.20 A M

The CIO calls International Data Corporation (IDC) Vice President Frank Gens, who sets in motion an international study of the operating record of the minicomputer at its user sites.

#### FRAMINGHAM, MASSACHUSETTS • 12:30 P.M.

Rebecca Segal, director of IDC's Customer Service Program, quickly assembles a task force which con the talents of IDC researchers and analysts, and CW Communications, Inc. editors and reporters.

Computerworld Editor Bill Laberts and industry specialist Pere Barrolik, begin scrutiruzing. CW Communications: News Network database to retrieve pertinent information about the computer system in question from IDO's 85 publications around the world.

#### EUROPE, ASIA, SOUTH AMERICA • 2:00 P M

IDC field researchers in 12 countries interview the users of the minicomputer, review their usage parterns, examine work loads and determine levels of support available from local service personnel.





#### Aspen stock swap CONTINUED FROM PAGE 83

1480 tape drive for the IBM 3480-compatible tape drive market Aweida Systems is an OEM marketing

and distribution arm for Aspen and mar kets such products as disk subsystems from Hitachi Ltd. The merget combines several former

xecutives and founders from Storage Technology in addition to Aweida Lousville, Colo-based Storage Tech nology now competes with Aspen Peripherals in the 3480-compatible market. Under the agreement, Aweida, a Storage Technology founder and the pressdent and chairman of Aweida Systems, as-

sumes those positions with the merged companies

Aweida left Storage Technology in 1984 at the time the company began restructuring under Chanter 11 of the Federal Bankruptcy Code and later formed

#### Aweida replaced Lundell

Aweida replaced Donald Lundell, who resigned from Aspen Peripherals several with management, sources said In addition, Ron Vitulio, a 15-year veteran of Storage Technology and former vice-president of Aspen, returned to Aspen Peripherals in that capacity several

Sources said Vitulio left Aspen Pen-

pherals after differences arose with its board of directors, but this could not be confirmed

Irm McGure. Awerda Systems' execue vice-president and a former Storage Technology marketing executive has been named executive vice-president for

Aspen Peripherals. A spokesman for Aspen denied that the amount of former Storage Technology management running Aspen Peripherals

would once the newly merged companies an unfair edge over one of its competitors.

#### IBM largest competitor "Although Storage Technology is a sig-

nificant competitor of ours, the importa thing for us to understand is how IBM works," said Alan Kenney, Aspen's general counsel, adding that IBM is Asten -

largest competitor Aweida showed "a great capacity for leading Storage Technology to the from

tier and if he can duplicate that then Aspen Peripherials really will raise the competition for Storage Technology according to Michael Martin, an analyst with Boettcher & Co., a Denser-based onsulting firm The two private companies are not

planting to go public according to Kenney although he said that was the firm -

The combined companies have about 100 employees and will maintain administrative offices in Boulder, Unio with en gneering and manufacturing in Long

# out of high tech decisions.



Len Rust, managing director of IDC Australia, and the CEOs at 11 other IDC international research offices evaluate the field researchers' findings and compare them to the current minicomputer maintenance and support ex-perience for various brands in their markets.

#### FRAMINGHAM MASSACHUSETTS • 4 00 P M

The preliminary findings arrive via fax, telex and 5-mail to be analyzed by IDG's project task force. IDC Senior Analyst Tim Caffrey writes the final report which points our that the minicomputer in question is experiencing a high failure rate, and the piler's maintenance teams in seven countries are not adequately ned to keep it up and running.

#### SAN FRANCISCO, CALIFORNIA • 5-45 F M

Based on the study's findings, the ClO decides to cancel the previous purchase order, and asks that his information Services Team make maken an alternative purchase based on IDC's maken and maken and recommendations.







COMPUTERWORLD

#### Cincom sheds CONTINUED EDOM DAGS 82

up to a mix of products to run on systems from Digital Equipment Corp. and Wang Laboratories, Inc. The company has been developing. DEC-compatible products since 1978, but with the growth of distributed DEC systems, Cincom decided to

formalize its commitment to DEC In addition, the company is evaluate the development of products compatible with Unix as well as systems made by Honeywell Bull. Inc and NCR Corp.

Today, roughly 80% of Cincom's busi ness comes from the IBM-compatible are na while 10% to 15% comes from a grow ing array of products based on DEC VMS Cincom says its support of DEC should ac celerate in coming years.

Users are going to have multiple IBM data bases and multiple DEC data bases tween the two." Hank says

The Supra relational DBMS will allow cations developed under IBM -MVS. for example, to run under DEC VMS operating system. Hank savs

Am apply atom written for IRM wall run on a VAX with 100%." says Thomas-R McLean, Cincum's vice-president of marketing and product planning Standing in DEC. IBM shadows

Cincom says its corporate stance will be somewhere between the shadows of the two largest vendors on the block, IBM and DEC Cincom says it is putting customers in

control of their networks by allowing them to move entical applications as they reconfigure their distributed systems We're not pro-IBM or pro-DEC. "We're pro-uses

In the future Vablonsky says Cincom will be more market driven, and product lines will be customized for applications in vertical markets including insurance, hospital, manufacturing, financial and govrnment. To ease this marketing change Cincom has decided to provide a thorough management-training program for the

employee organization The past few years of growth have been difficult at times Yabionsks as knowledges "It's kind of like grung through the sound barrier. We struggled through that, and found that growth recurred formal procedures and systems ing curve, and we believe we have the in frastructure in place to handle up to \$200 million in sales a year

If you're thinking about converting to IBM's latest VSE SP release, you'll need a lot more than luck to see you through for starters, you'll need longer work days, more staff, and a larger budget But there's a proven, cost effective alternative the MVT VSE operating system from Software Pursuits featuring multi-path channel scheduling and 15 dynamically allocated regions. And if you can't word the conversion, you can still add the new industry standard SPRI spooler to make your system faster and more flexible. Both come with all the high-performance features. 24 hour technical support, and on site installation assistance you'll ever need. Get all the facts. Call us today for more information and your FREE "DP SURVIVAL KIT" And throw away the rabbit's foot

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#### Will and MYT YP on represent macroins of valence forces by. If the "valence forces to

#### Shade of blue EDOM DAGE 83

• At Rolm Corp., a tighter IBM rem on the sales force and the replacement of President Dennis Paboonan with 25-year True Blue-er Ray AbuZayyad. So much for "intrapreneurship . Vice-Chairman and old-lines Paul Rizzo announces retire ment: Kasaar Cassami and Jack Kuehler move up. The last of the John Opel men departs

 A new DB2. Not actually announced yet, but expected this summer [CW. April 13]. More ulcers for salesmen from Software AG of North America. Applied Data Research, Inc. System/36, VM-based Solu tion Pacs and stepped-up deliv eries of the 9370; more clean

ing up, and shoring up, midrange marketing. · Further hints, particularly in Europe, of a real commitment to at least some parts of the Open

Systems Interconnect protocol Quite a handful, Taken to sether, IBM's apposingements clearly show how much the world has changed and how much IBM is willing to, or has to, change with it. Not very long ago, the IBM

#### world was relatively sample While taking orders and befty profit margins on, say, 3080s and 4300s, IBM could look in

its crystal ball and see \$100 billion in annual revenue by the and of the darada. Just for fun, it sent Phil Es tridge down to Boca Raton, Fla., to see what he could do with a currous novelty called a micro computer . . . and another man

ket was cornered. Profits hummed along, and a Republi can Department of Justice decid ed buz computer monopolies were not so bad after all. Furthermore, there was plenty of oom for third-party servicer and lessors to prosper by riding

the IBM wave Today, a different world This month, Akers and his charges see a very different world. The company has essen trally admitted it has not been

fast enough, responsive enough or lean enough to prosper - at traditional IBM profit levels in the world of networking, distributed computing and severe In 1985, IBM and the entire

mainframe industry saw business start to slin: IBM called it a down cycle and attributed it to lower capital spending, a strong U.S. dollar and various other

macroeconomic forces. In 1986, better known as the year of DEC. Bug Blue realized that it had to change. While implement ing a cost-reduction plan of unprecedented scope, it stepped

way it did business. What the industry has seen in IBM's announcements this year are the results of those de isions. More notable as strate gic future directions than actual products, IBM's recent moves show a company that 1) will compete toe-to-toe with third party companies that have un dersold it for years; 2) will exercise tight control on all of its business units; and 3) will attempt to promulgate a new semiproprietary standard in cor porate microcomputing

Clearly, this is just the beginning. Rather than resisti industry forces as it has in the past, IBM will continue to change and map new strategic The ultimate results for Big

Blue, its users and competitors remain to be seen. It is true that an elephant takes a long time turn itself around. But once it does, its momentum can be very powerful

Wilder is Computerworld's senior edtor computer industry

#### Firms merge to win power in Unix mart

BY JAMES A MARTIN

SAN JOSE, Calif. - Unix-based systems vendors Arete Systems orp and Plexus Computers. Inc. amounced last week them intent to merge in an effort to gain a stronger position in the nex marketplace. The merger will be accom-

pished with an exchange of privately held stock, although the amount of the merger was not The combined companies will be known as Plexus Computers.

, with a combined revenue of \$65 milton in 1986. The merger will combine Arete's strengths as an OEM with Plexus's end user and value-added reseller channels

Arete manufactures a somes of multiuser, multiprogramming Unix-based workstations bases on the Motorola, Inc. MC68000 series of microprocessors and supports up to 256 users. Plex us founded in 1980, we said to be the first commer '-Pi supplier of The merg-Unix-based syv er increases th adth of Unix-

based producthe two firms can offer their combined in stalled base of some 3.500

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#### Vendors FROM PAGE 83

nf \$110.2 million, or \$1.71 per share, for its first quarter ended

Their revenues were above our expectations," analyst Labe of Drexel Burnham said. "Their emputer orders were up in March, which is pretty good conodering they've reorganized their marketing worldwide in the

last few months Last courter the company reported a substantial loss because of charges from merger related asset sales, write-downs. plant consolidations and work

force reductions Amdahl Corp. For its first puarter, the Sunnyvale, Calif. based developer and manufac turer of large-scale systems reported \$318.5 million in sales and profits of \$25.2 million, or 51 cents a share. In the first quarter of 1986, sales were \$200.2 million and earnings \$2.4 million, or 5 cents a share Analyst Steven Milanovich of First Boston Corn, said Amdahl had a "better ouarter than Wall Street expected" because of vol shipments of the 5890 mainframe line and 6380E double-capacity disk storage say 'Last year, they were sell ing older products; now, they've

and two new products shapping in volume." he added The analyst said that in the los a term he believes the compa ny's growth will have to moderate. "to more closely resemble frames and disk drives, which is growing certainly a lot less than

Amelahl's revenues have been rowing recently Data General Corp. West boro, Mass.-based DG missed the industry upswing and posted an operating loss of \$9.6 million or 36 cents per share, for its secand quarter, compared with income of \$2 million, or 8 cents per

share, for the same period last The company also reported extraordinary charge of \$18.2 million, or 68 cents per demotion of debt, and a one-time loss of \$14.8 million, or 55 cents per share, resulting from the write-down of its investment in unconsolidated affiliate. Chapter 11-bound Dama Com munications Corp. DG's loss for the quarter, including the nonre curring items, was \$42.6 million.

or \$1.59 per share. was \$31.2 million, up from \$26.1 Sales for the period were \$315.2 million, compared with sales in the second quarter of 1986 of \$318.8 million Apollo Computer, Inc. The workstation manufacturer

attributed its 50% rise in sales in the first quarter to advanced produ : developments and tech nological enhancements, including its Network Computing Sys tem, introduced during the For the period, Chelmsford, Mass-based Apollo had earnings of \$6.4 million, or 18 cents per

share, on sales of \$123.4 million. In last year's first quarter, earnmes were \$539,000, or 2 cents a share on sales of \$82 million Stratus Computer, Inc. Stratus President William Fos-

ter credited a 39% like m sales to early market acceptance of the XA2000 systems, which accounted for 75% of product sales in the quarter For the period, sales were

\$37.4 million, up from the previous year's first-quarter sales of \$26.9 million Earnings and earnings per share for the quarter were \$3.7

million and 19 cents, respective ly, compared with \$3.05 million MDAHL'S growth will have to moderate, "to more closely

resemble the underly-

ing demand for mainframes and disk STEVEN MILUNOVICH FIRST BOSTON CORP

and 16 cents for the same period last year Sales for the Bedford, Mass. based company's first quarter climbed 24% to \$139.8 million

compared with \$112.9 million a year ago. Income for the period was \$5.8 million, or 20 cents per share, compared with a loss of \$7 milhon, nr 24 cents per share, a year ago. The income included a \$4.7 million gain from the sale of

Sun Microsystems, Inc. stock, Tandy Corp. Consolidated sales and operating revenue for the third quarter of Tandy's year were \$776.9 million, an increase of 12% from 1986 sales of \$693.4 million

Income for the period row 20% to \$50.4 million, from \$42 million in the same quarter last year. Per-share earnings increased 19% to 56 cents, compared with 47 cents last year Ungermarm-Bass. a decline in sales to OEM and industrial networking customers, profits increased 50% to 1.2 million, or 7 cents

ner share. Revenue for the firm Software Publishing Corp. A 334% increase in it come and a 91% increase in sales. from last year's second quarter were recorded for the Monet son View. Calif.-based business soft-

e supplier For the period, earnings of \$1.6 million, or 21 cents per \$10.9 million. In the like quarter

year earnings were \$365,000, or 5 cents per share. on sales of \$5.7 million

Texas Instruments, Inc. iales for the electronics grant's first quarter were up 11% to \$1.3 million, from the \$1.15 mil han in sales recorded for the like period in 1986

Earnings for the period were \$83.8 milion, or \$2.77 per before extraordinary items, which compares with last year's first-quarter loss of \$23.8 million, or 55 cents per share before extraordinary items, the commony said

Britton Lee, Inc. The Los Gatos, Calif.-based manufactur or of relational data base man agement machines posted a loss on lower net sales for its first cuprier anded Myrch 31

For the period. Britton Lee had sales of \$5.7 million a decrease of 21% compared with the \$7.2 million reported in the like quarter last year. The net loss was \$1.9 million, or 24 cents per share, compared with income of \$189,000, or 2 cents

per share, in the 1986 period Increases in systems and sale appear to be extending sales ycles, resulting in less predict abbr quarter-to-quarter able quarter-to-quarter re-sults," said David Britton, presi

MCI Communications

Corn. For its quarter ended March 31, MCI announced sales were up 3% to \$955 million and reported income was \$25 mil lion, or 9 cents per share. For the umilar period last year, sales were \$920 million, with a loss of \$502 million, or 8 cents per share. Income for the most recent period includes a pretax gain of \$12 million from previously negotiated anutrust settle ments. Sales increased approximately 4% from the Decemberto-March ouarter despite a March 1 rate reduction of approximately 9%, the company

Paradyne Corp. For its first Paradyne ales of \$55.9 million, down 15% from sales of \$66 million in the first ouarter of 1986

For the period, the data comunications equipment in facturer posted a loss of \$1.9 illion, or 8 cents per share, which included a \$723,000 extraordinary credit of 3 cents per share as a result of tax benefits from previous losses. The loss comparer with income \$875,900, or 4 cents per share including a 1 cent per share extraordinary tax credit for the

parable 1986 period Electronic Data Systems Corp. The Dallas-based comterred a 16th increase in income from \$55.6 million, or 46 cents per share, to \$64.6 million or 53 cents per share, for its first qu ter. Sales rose 4% from \$997 million a year ago to \$1.04 bil-

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disencharated with the price of their success - namely the lack of freedom to pursue In industry, you have to work on whatever government

contract or other business your is involved with. whether or not it is of any interest to you." says Dean Paul Cal-Japhan of Northeastern Universty's College of Computer Science in Boston, "Those kinds of restraints get to you after a while I know - I was in the pri vate sector myself for 10 years before coming here

Approximately one third of Northeastern's computer scionce familia made the transition from business to the classroom. Callaphan says. Typicalty Northeastern's faculty members already had earned Ph.D.s be fore they left private industry and many were conducting research for leading computer

In addition to the limitations of business, the uncertain busisalary. Callaghan says. Profesness climate in the computer in-

professionals into academia Many companies - IBM for

- are helping employees who are laid off or early retired find other careers, including teaching," says Dan Cougar, distinguished professor of computer and management science at the University of Colorado. However, I don't see any indication of people with solid jobs leaving them to go into teaching.

though they may teach on a part time basis, in addition to their positions in industry." Accredited institutions are allowed to employ part-timers to fill 20% of their faculty requirements, he

Money is the main reason many people do not leave industry for teaching, Cougar says. The salaries are nowhere near comparable, even considering

the shorter work year in arademin "he adds However, computer profesunnals who teach can also augment their income by consulting. Most universities allow profesto consult one day a week and deans encourage them to do so, since they realize it's the only

way they can hope to attract and hold qualified teachers." Cougar Consulting does more than add merely a small amount to the

Callaghan says. dustry is also forcing many MIS sors who choose to do private consulting one day a week and during semester vacations can add enough to their teaching salaries to equal what they might

> sand dollars a year is not out of the question for a top-notch profavor loorsultunt " he adds Of course, it takes a while to

> reach that level. For that reason, Callaghan says, people with fam-

for every holder of a Ph.D. looking for a job, and at least 15% to 20% of all family openings in computer science are infilled George Lucas, a former re-

earther with Bolt Beranek and Newman, Inc. and currently an associate professor of math and computer science at the University of Massachusetts/Boston earn in industry. "Ninety thouhad no trouble making the switch to academia, mainly because he hada Ph.D

Though a doctorate is a nessity at the university level, it doesn't have to be in the particube discipline in which you are

YEAR AGO, there were 25 openings in academia for every holder of a Ph.D. looking for a job, and at least 15% to 20% of all faculty openings in computer science are unfilled."

> DATE CALLACHAN NORTHEASTERN UNIVERSITY

dy responsibilities tend not to leave industry until they have bought a home and put their children through college. "They work in industry to finance their acquiring," he says. "Then they decide to come back to innoven-

Schools are currently seeking professionals who hold Ph.D.s. and have attained at least one high-level position in a leading "A year ago, there were 25 openings in academia

seeking a teaching position." Lu cas says. "I'm teaching comput er science, and my doctorate is in theoretical physics.

While a doctorate is almost alceptions are made. Twenty per cent of the faculty of an accredit ed institution can be non-Ph.D holders. Most universities seeking computer science teachers are usually willing to consider someone who may not have a dictorate but who has an out standing background as a high level manager in industry

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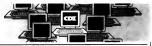
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### JUNE'S COMPUTERWORLD FOCUS ON DATA SECURITY AND SYSTEM PROTECTION CLOSES MAY 1.

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As more and more companies continue to expand their corporate data bases and more and more individuals gain access to this proprietally information, the super of data security becomes increasing important to MS professionals. The area Computerwood Procis suse will be them determine the need for system protection, evaluate available safeguarding measures, and choose the security devices that best if their needs.

Such to first it if doos power conditions will help our reades sort out this seemingly complex usue from such to first it if doos power conditioners for micro, miss and marfames detail available product oppose; earnine the growing value of flush obleant computing systems—look at the encessing importance of network security—and study how hundreds of other managers are successfully implementing data security systems (Na—a special feature section will focus on disable successfully implementing data security systems (Na—a special feature section will focus on disable controlled to the controlled of the controlled

Computerooid Focus pasts you in touch with a powerful audience of Mis podesspoals in volved in a market which speeds over \$200 billion arrivally food leads not past declivations of ever 17,000 subscribes as well as thousands of pass-along leaders Plus, borus distribution of the laure floors asse a NSC \$37 in Changay will give you in booth with thousands more floor market equipment and services for data security and system potention. June's Computerooid Focus sous as you kny for inchanging out aligned audience.

### In June, we focus on data security and system protection. And we'll distribute bonus copies at NCC '87.

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the most appropriate hardware and software options

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May 25	PCs — IBM & Compatibles	May 8
June 8	LANs	May 22
June 22	Printers — Line & Character	June 5
June 29	Accounting Software	June 12
July 6	Manufacturing Technology	June 19
July 20	Accounting & Financial Software	July 3
August 3	Communications Software	July 17

### **STOCK** TRADING INDEX



Indexes	Last Week	Thus Wee
Computer Systems	138.4	143.6
Supplies & Accessories	152.6	151.5
Software & DP Services	128.6	130.2
Semiconductors	111.5	113.8
Peripherals & Subsystems	126.8	127.8
Leasing Companies	113.7	116.9
Composite Index	116.7	117.0
S&P 500 Index	170.1	171 7









# Computerworld Stock Trading Summary

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## Apple stock to split

#### IBM, DEC post gains; Prime boasts 25% rise in two weeks

While the overall stock market moves up and down like a ye-yo, computer stocks, in general, continue to perform well.

The industry's second straight week of

encouraging first-quarter results helped boost most vendors' stock prices, while the Dow Jones industrial average followed a 66 point gain Tuesday with a \$1-point nosedive boung gin russusy with a 51-point nosedire Wednesday. The week's big stock news came from Apple Computer, Inc., which an-nounced that it will split 2-for-1 when the company pays its first quarterly devidend June 15.

Apple was ripe for a split; it has been trad-ing in the 70s after dropping as low as 27% within the past year. It closed Thursday in over-the-counter trading at 76 points, up 41/2 in the first four days last week.

IBM, buoyed by a seven-point surge in Tuesday's rally, closed Thursday up 41/4 points for the week to 1541/4. Digital Equipment Corp. rebounded meely from a big drop two weeks ago, gausing 8½ points to reach 165½. Prime Computer, Inc., which an-nounced strong first-quarter earnings. jumped three points to 27%; the stock has risen by 25 % in the past two weeks CLINTON WILDER

ods are sale for the transfer of

data or IBM programs, an IBM

orams and have determined that

they will work on the new me-

dia," IBM spokesman Cary Zeider said, "but we have not

tested all IBM-compatible soft-

ware and users will have to

check with their software ven-

ed. Lotus also cautions that it

cannot guarantee the perfor-mance of its 51/4-in, format soft-

buy programs such as Copy II

Central Point Software in Port-

Staan disk drive

Some users are electing to

software package from

dors for compatibulty.

ware line on the PS/2.

spokesman said. "We've tested our [IBM] pro

# MIS: Shift to 3½-in. disks slow, careful

Use of 51/4-in, floppies to continue indefinitely as managers deal with media compatibility issues

### BY JEAN S. BOZMAN

MIS managers at large corpora tions are planning to move to IBM's new 3½-in. Personal ually and are devising methods

to continue using their existing i-in. floppy disks indefinitely The strategies are intended to deal with some basic incom natibilities between the two storage formats, which in some cases present correct PC programs from running on the new

While impressed with Per-System/2's capabilities. MIS managers at more than a dozen large IBM shops said last week they are concerned about issues of media compatibility as well as the difficulty of maintain ing multiple standards in the

same shop. The users, which include Aeta Life & Casualty Co., Texaco. Southland Corp., Mellon Bank Corp., Robert Bosch Corp. and Price Waterhouse, are all honging a few sample models of created on the older PCs. How the PS/2s in-house by nin them through their paces before recommenting volume orders. What users are looking for is evi dence that older PC programs all not run smoothly on the new PS/2s - and for any problem in transferring data or programs to the new 3kmin floopy diskette

The companies are also trying to determine to what degree the PS/2's hardware differences The muration aid uses orinter with the older PCs, including difrent device drivers, will affect PC software performance.

"I don't want to be on the reding edge," raid Ron McKee data communications specialist at Robert Bosch Corp., a Maywood, Ill., based maker of autoparts.

There are a variety of methods to accomplish data and program migration to 310-in, diskettes. IBM recommended four

alternatives, but the conversion poses a considerable manage ment issue, according to users It's going to be a pain to change over the software for thnusands of PCs," said Donald

Smith, a Chicago partner at Price Waterhouse and the firm's national coordinator for microcomputer consulting. "We hate to go through at

#### Wants 5 %-in. drive Price Waterhouse, for one, said at washes IBM had included a 5%in drive on its new systems, allowing side-by-side use of older

programs without the need for data migration Instead, users will have to follow IBM's recommendation that they buy an outboard 514-in diskette drive for the PSr2s or add an inboard or outboard 5 m deve to their older IBM PCs or PC XTs. All of these options will allow PS/2 users to run old IBM programs or use data files

ever, many existing programs including Lotus Development Corp 's 1-2-3, will not run on the PS/2 without an upgrade sup nised by the vendor (see story at right) The actual data transfer can ished through the use of IBM's Data Migration Facility ty, a \$35 ks that allows users to send data or IBM prugrams from their older PC to the new PS/2

cables and the parallel ports on the backplanes of both the older and newer PCs. Another alternative is to downkne load programs from a

twork file server to the new PS/2's 3½-in, diskette drive, All of the IBM-recommended methcompanies to set memory limits

on desktop computing 'If a user needs more than 20M bytes, [Pepsico and General Foods] think users should be

dialing into the network or the mainframe and that they really don't need a micro." Fitzsinmons said. "They think the Model 50 is ideal for 90% of their us-

#### Considering Model 60 However, some MIS and micro. managers said last week that the Model 50's slow duck access time, coupled with the inability to replace the drives with faster

less expensive ones from third party suppliers, is forcing them to more seriously consider purchasing the Model 60. 'I would like to get [Model 50sl without the drives and put in my own, but I can't," said Rob-

weight out of it?" ome MIS managers IBM is using the Model 50 as a market that its PS/2 line is price competitive. Except for memury and disk draw expansion options

than the Model 60. An IBM spokesman confirmed last week that corporate

that the company could not youch for the performance of 1-2-3 when it is run on

There are new device drivers in the new IBM [personal computers] which the 5% copies of 12-3 do not address. Our sulution available on the 3% untage of the Personal System 2's new

A Lotus spokeswoman said last week

in drives pext month will take full ad The spokeswoman added that not all of the company's products are slated to be available in the new formst in the near finture New versions of Express, Symphony brary will probably get IBM -Data Migration Facility accordto Proce Waterborner -

Other firms, such as Bosch plan on installing outboard 5% m, diskette drives for the new systems and inboard 31/2-in disk drives an older PCs to allow pro grams to be copied in the new machines or to be used in the add on do k drose. Bouch his si ready used this approach for its IBM compatible lanton comput ers from Toshiba Corp., which

use a 31/2-in diskette

Doubts about the ease of con version are causing some users to hold off on endorsing the PS/2. Ed McDonald division manager for Texacu's Information Processing group in House ton, said he wants to test the new machines and the migrative of data from the older PCs to the wer ones "We want to know what the requirements are be fore we put the Personal Sys tem/2s on our recommended

#### However, a Lotus spokes woman said, "We would not ad vocate breaking the copy protect tion of our soft ware packages. Users cannot, for example. py 1-2-3 from their XT to a PS/2 and run it unmodified For Different approaches one thing, 1-2-3 is copy-protect-

land. Ore., that will copy 1-2-3

and 200 other protected pro-

grams onto a nonprotected dis-

kette. Central Point is beginning

shipments this week of a new

version of the Copy II PC pro-

gram customized for the new

PS/2 models. President Michael

Brown said.

With such a variety of option large MIS shops are planning dif ferent approaches to the chall lenge of switching over to the 312-in medium. Price Water house's Chicago office alreads maintains a software library for PCs that houses dozens of soft ware programs. That central is

### Lotus advises wait for new 1-2-3

and Freelance will be available by the end users of its popular 1-2-3 software of this month but the studenwoman would not commit to simpping dates for to use a new 3tr-in, diskette ver sion of the package on IBM's Per-355-in versions of other programs includ ing Human Access Language Manuscript sonal System 2 computers rather and Metro They will be available before run the program from an external the end of this year, she said

list "he said

otus and 1-2-3 cannot be transferred to 3%-in disks using IBM's Data Migration Facility (see story above). The IRM mi gratum tools are just not compatible corp -protected software like Let us 1-2-3 the Lotus spokeswoman said last week Users can however migrate their Lotus 1.2-3 data files by using the IBM migra-

An exchange program will go into et fect in May that allows users to trade in their 5's in floops diskettes of 1:2-11 new Pa-in ones Lotus said it will charge \$30 for the exchange

IFANS ROZMAN

## Model 50

The Model 50, so far, has not been a "barnburner" in terms of sales, Wagner said, although his stores have had a "reasonable sales flow. "We will sell everything we get in, I expect it's goang to be a pretty hot product he added Ironically, the Model 50's mited expansion options are

seen as a plus by some buyers Matt Fitzsimmons, manager of a Computerland outlet in White Plans, N.Y., said Model 50 sales have been brisk. He said major corporations such as Pepsico, Inc. and General Foods, Inc. are buying Model 50s, in part be cause they cannot be exbeyond 20M bytes, allowing the ert Corr, director of strategic planning for Electronic Data Systems Corp. (EDS) "I think you would be crazy to buy it, and think IBM was crazy to do it. What can I do with an 80-msec drive except make a paper-

ort of "loss leader" to show the the Models 50 and 60 have the same features. However, Model 50 is priced \$1,700 less

sers cannot buy diskless Model Sils. He said IRM decided to use the Rikmann draws because it

felt many of the customers who would use the Model 50 would find its dask speed acceptable. We looked at the perfor mance levels required by cus-

tomers, and taking into consider ation variables such as the channel speed, disk caching and 1-to-1 interleaving, we thought the throughput was appropri ate." said Jim Monahan, an IRM snokesman

White some MIS managers admitted that the enhanced in terleaving technology makes the Model 50 faster when doing sequential searches, they said it is not as efficient when moving track to track

"If you're doing sequential UD the 1-to-1 interleave will buy you a lut. If you're doing a lot of random I/O with very small records, then it's going to be very

slow for you - as slow as the IBM PC XT." said Julian Horwich, directur of the Chicago Association for Microcomputer Professionals Horwich admitted however, that he had not completed all of his scheduled benchmarks of the system

EDS's Corr and two other MIS professionals intersessed last week said the inability to expand the memory capacity of the Model 50 is another habity. They said a machine with such a werful chip should have per aps as much as 40M bytes so it can accommodate personal as

well as enterprise data. The Model 50 pricing is rel atively low, but its limited growth nath plus the hand disk is a currous thing." Horwich said Staff writer David Bright contributed to this report

### Service firms

market. 'PCs are being used more and more throughout organizations, and mainframe sales are slowing, explains Rick Sherland, a software specialist and vice-president of investment research for Goldman, Sachs & Co. on New York

This probferation of microcomputers also creates demand for host systems, particularly in the service sector. Sales of mainframes, however, will increase 2.8% per year through 1991 according to International Data Corp (IDC), a market research firm based in Framing

ham. Mass. PC growth may exceed 20%, analysts say For Mellon's DrNardo, the reasons to buy are sample: Important new applications and

ompetitive pressures in the banking industry spur the need for more and more CPU cycles. "In banking, the computer is the production machine " he observes. In fact, Mellon, which installed an IBM 3090 Model 400 in January, will have another in place by September. DiNardo

Better delivery is key IDC estimates that the hanking industry will increase systems spending by 6.6% through this year, the third fastest growing spending group. "The key for all these industries - (banking, finance and insurance | - is better delivery of information." 5855 Marty Gruhn, vice-president of The Sierra Group, a Tempe. Ariz-based research and con-

sultinia firm. Both recently published and inpublished Sierra Group reports find that banking, finance and maurance are increasing computer spending for the same reason; to increase productivity This goal points to the sernce-sectur firms' intense desire to remain competitive. In banking, much of the increased competition is the result of the deregulation that occurred in the

late 1970s "Banking is expansionary at the moment. The new services neing offered and new fields entered require a bigger and better

hardware platform," says an executive with a large East Coast bank Such deregulation is leading banks to compete for business by offering more services such as faster turnaround on loans and mortgages, many of which require new software and CPU resources.

Pressures strain resources Although insurance is still a reg ulated industry, competition pressures and bolder customer demands are straining current computing resources. IDC esti-

mates systems spending in the arance industry will increase 13.3% through this year. The industry is changing in terms of demands by custom-ers," says Theodore T. Tansi,

vace-president of Phoenix Mintiall Jaleurance Co. a Harrford Conn. based firms According to Tansi, nontraditional insurance applications are

suming a large amount ni CPU resources. "Many of nur additional products are not traditional but are linked to vecure ties, such as tracking securities' prices," he says. Other new insurance applica-

tions include proposal genera tion plus an increasing number of experimental applications, such as expert systems, which are highly CPU intensive. These apnicetions are aimed at serving an increasingly sophisticated ch ent base, Tansi says.

While much of Phoenix Mutual's work is done on microcom puters, demands for mainframe systems also continue to climb When you put a policy on the books, you need a CPU to administer it. Tansı says. Such demand led the firm to unstall an IBM 3090 late last year, and Phoenix Mutual reportedly plans to bring in an IBM 9370 in two or three months on an experimen-

Many figancial services firms are adding computer nower simply to keep up with the growth in business. Productivity is another reason. "There is an increasing share of things being automat ed." observes Alan Kornbluth Vice-president of corporate sys tems for American Express Co "Technology is a way in which we deliver our products. We are

sake of technology."

Mainframes remain on Amer can Express's shopping list American Express is experi encing mainframe growth. That prowth is slower than it was a couple of years ago but higher this year than last." Kornbluth explains. IDC estimates that spending in the financial services industry will increase 19%

through this year At E. F. Hutton & Co. in New York, hardware expendits have increased gradually, but consistently, during the past five years and are expected to contimes that was sen the near for ture, according to Bernse Wein stem, first vice-president of information systems and telecommunications. The most siginficant recent investment is th

\$20 milion purchase of 10,000

### NCR Corp. 3390 microcomputers first announced in October Steady growth

We have had a steady growth in computer spending in recent years," Weinstein says, Microcomputers will occupy the bulk of E. F. Huttoo's spending plans for the next few years. Wain stein adds. After the PCs are placed throughout the compa ny's nationwide offices as work stations for brokers, further ex penditures are set to include applications software, network

peripherals. Financial firms experiencing slower growth are happy with the systems already in place We bought an IBM 3090 Model 180 last year but haven't been growing all that much sioce Over the next 12 months, we feel we have enough capacity with the 3090 " says lerry Conover, vice-president of the com-

puter center for Avco Financial Services, Inc. in Irvine, Calif Industries experiencing less growth in business are spending less on computers. IDC estimates that the combined systems spending of agriculture mining and construction will decrease by 8.6% through the

Stall writer Alan J. Ryan and West Coast correspondent James A Martin contributed to

this report

INSIDE LINES

Will the Link break? The Software Link is getting down to the wire on its self-imposed target delivery date for PC-MOS, its 80386-based operating system. PC-MOS was announced in the fall and was supposed to ship in February. That date was subsequently rolled back to April, Software Link cofounder Gary Robertson says he will know after a meeting scheduled for tomorrow whether the product will ship this month. Meanwhile, the Atlanta-based company is garnering a lot of mk based oo its relationship with network software vendor Noveli in Orem, Utah, on which Robertson declared to comment. Apparently Novell has picked some hints from its much-publicized relationship with IBM. You should see the nondisclosure I had to sum." Robertson

End of the rainbow. While DEC's Rambow personal inputer has been on its way out for some time. DEC has at last written the product's final chapter. No more machines will be produced after the end of this year, and customers have been asked to place their final orders.

Will the AT still be around? Wang's IBM Personal Com-puter AT-compatible, whose introduction has been rumored for months, is not "vaporware," according to lan Diery, Wang's head of U.S. marketing and operations.
Wang has been taking orders for the Intel 80286-based mcro and will officially announce the product in a few weeks, Dieny said

Take them, not us. Amdahi, National Advanced Systems and Honeywell Bull did their best to steer the U.S. government's sanctions on Japanese products toward microcom puters and away from their own Japanese supplied mainframes and disk drives. In written filings to the government the three firms offered helpful suggestions. For example, Honeywell Bull's filing said, "This definition would let mincomputers, desktop and latptop computers and com products which are either not integral parts of large-scale systems or which can be obtained from non-Japanese

Will he shop for Apples? Are Apple and DEC close to an official agreement on perfecting Macantosh-to-VAX links? Industry sources have speculated that Apple and DEC may soon announce a Decnet hookup for the Mac based on technologies developed by Decnet architect Stuart Wecker, now president of Technology Concepts in Sudbury, Mass. DEC President Ken Olsen's travel plans call for him to be on the West Coast on Tuesday. Stay tuned

Take it back, boys. The legal moves of three European leasing companies challenging IBM apparently were stopped in the Netherlands by an Amsterdam District Court judge who denied an injunction request based on the lessors' claims that IBM violated regulations on pricing and mainte nance. IBM officials reported that the judge refused to issue the injunction and ordered the lessors to send a circular customer letter retracting claims they made in an earlier customer letter when the suit was filed last month,

What would Tom Sr. think? American Express may become the next IBM 8100 user to delect to DEC, according to IDC Vice-President Frank Gens. Gens told attendees at IDC's annual DEC conference that American Express is considering VAXs to replace the discontinued IBM midrange system. Aetna made the 8100-to-DEC leap last year

Hit me with your best shot. Lotus is set to unveil today its strategies for tapping the power of IBM/Microsoft Operating System/2. Lotus has already committed to redoing 1-2-3 for the protected mode of OS/2. The firm is also expected to detail plans for the Presentation Manager, a graphics user interface for OS/2 based on Microsoft Windows

It's a GEM. Digital Research is scheduled today to soin the desktop publishing fracas with the release of Graphics Envi-ronment Manager Desktop Publisher. Unlike other desktop publishing packages on the IBM PC and compatibles that run under Microsoft Windows, Digital Research's product operates under GEM, its own graphics user interface.

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